MECHANICS

— AND —

FAITH.

— BY —

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ERRATA.

Page	19,	line	29,	for "beings"	read "being."
"	68,	"	29,	" strike out	"!"
"	72,	"	38,	"our"	read "an."
"	76,	"	27,	"those"	" "these."
"	83,	"	3,	"these"	" "three."
"	85,	"	21,	"the"	" "to the."
"	95,	"	38,	"matters"	read "matter."
"	113,	First paragraph to be read as a foot note.			
"	179,	line	40,	for "develepement"	read "development."
"	196,	"	28,	"knew"	" "know."
"	203,	"	25,	"determine"	" "determines."
"	204,	"	31,	"imitate"	" "emulate."
"	219,	"	13,	"men's"	" "man's."
"	221,	"	29,	"of"	" "or."

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Dear Sir :

The following papers are of such a nature that it seems to be the prudent course to submit them to criticism before publication. I have, therefore, had them put in type, and a few copies printed in this form, and the type distributed.

It is my intention, after having obtained the fullest criticism that I I am able, to make a re-study of the whole subject.

I shall esteem it a great favor if you will read the papers, and note in the margin, or on the right-hand page, faults and errors, large or small, that you may detect, and points of criticism that may occur to you. The course that I have pursued is the best assurance I can give that I desire faithful and thorough criticism.

I am especially anxious lest I may have been an unintentional purloiner of the thoughts of others. Please nail anything of this kind you may discover, and if convenient give particular reference.

When your notes are completed, will you kindly return the book to me at above address, *by express.*

PREFACE.

In presenting the following papers, a few words seem to be called for by way of preface.

What is known to us as matter, in its various forms and states, is commonly conceived of as being something quite distinct from force. Here matter will be considered to be force itself manifested in endless diversity of adaptation to our nature and wants.

The exposition of this view will not, however, be reached until an advanced stage of the discussion. Until then it will be necessary to conform the language employed to the prevailing idea of a distinction between matter and force. Otherwise the truths which are attempted to be presented in the earlier papers will not be conveyed with clearness.

This conception of the identity of matter with force must be regarded as fundamental in true philosophy. In every department of thought there is to be observed a reluctance to recognize the fact that we are surrounded by mysteries. While in reality all things pass the limit of our understanding, there are not wanting minds that refuse to confess even that anything does so.

Instructors generally feel called upon to explain everything. In order that they may seem to do this, they assume imaginary starting points, which, having been devised either by themselves or by their instructors, are of course quite within their comprehension.

The great starting point is the material atom. The belief in the existence of the atom is the present bane of philosophy. This belief gives to physical science its materialistic tendency. It provides a limit at which thought can be arrested. It opens the door to the revival of the heathen conception of the atom, as self-existent and possessed of inherent activities. Many minds at the present day seem inclined to rest upon this conception of the

material atom, as something that can be comprehended, and beyond which they feel no impulse or inclination to look.

Much vagueness of thought prevails respecting the nature and functions of "the reason." Our view will be made distinct, and it is believed also correct, if we conceive of that which is commonly termed the reason as merely the judicial exercise of the mind, or as the conscious spirit in its judicial activity.

With the exception of abstract truths we discover nothing by the process of reasoning. In reasoning we trace relations, discriminate, generalize, conclude, and so determine our beliefs. These judgments we are forming continually, and we always must be forming them, on the basis of what appear to us as facts in consciousness.

Here arises the liability to error. This liability to error is of two kinds. In the first place, there is probably no one who is not, in a greater or lesser degree, affected by preconceptions or erroneous habits of thought, so as to be liable to arrive at conclusions which are not warranted by the facts observed. And, secondly, it is obvious that, in order to form a correct conclusion by the judicial activity of the mind, there must be presented in consciousness all the facts, certainly ascertained, and nothing else. Otherwise, the possession of even a perfectly judicial mind, or a mind that is capable of giving to every fact that is seen in consciousness its due weight, would be of no avail.

Force, Truth, Love and Beauty are the four spiritual realities which, in their unity, interpenetrate all material forms of being.

These spiritual realities are revealed directly to the spirit of man, while the forms within which they are contained are made known to him through his physical organs of perception.

For the sake of clearness, our perceptions may be con-

ceived of as being of two kinds, namely, those through which we are made aware of the existence of what are termed material forms of being, and those through which we are made aware of the existence of the spiritual realities which are manifested to us through these forms, or of which these forms are to us the sensible expression.

If these spiritual realities in fact exist, then it is evident that they must *all* be apprehended by us equally at least with the physical forms which then appear only as the media for their manifestation, or as the concrete mode of their expression, adapted to our physical nature, if we would avoid forming partial and superficial conclusions.

It is through the recognition of these truths that the mind becomes able to perceive the harmony that exists between reason and faith.

I have endeavored to reach these truths and to show this harmony by the aid, primarily, of mechanical science, and of the analogies that this science affords. As such an effort, these papers are submitted to the judgment of sincere men.

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INTRODUCTION.

To most persons, perhaps to every one at first view, the title of this book would seem to express the opposite extremes of thought. It would appear to be a bringing together of subjects which are quite incongruous, and between which no relation can exist.

A little reflection, however, will show us that this view cannot be the correct one, but must be only an effect of our conventional habits of thought—habits that have been formed by a false education.

There are no incongruities to be discovered in nature, but everywhere harmonies instead. No unrelated things exist, but all things are seen to be bound together by innumerable relations. If, therefore, mechanics and faith are realities, if one or the other of them be not a mere figment of the brain, then it is certain that they cannot be incongruous and unrelated, and it is possible that harmonies and relations of the most perfect and intimate nature may exist between them.

There is also another line of thought on which we are impelled to the same *a priori* conclusion. This reasoning, briefly stated, is as follows:

Faith is held by the christian to be the highest spiritual attainment of man, and an attainment that is ultimately to be reached by all men on the earth. This he believes to be the purpose of God. Now, if this be so, then everything must have a direct relation to this supreme result. It is not supposable that anything can in reality exist to antagonize this result. No incongruity can exist between faith and any other reality whatever. On the contrary, it must of necessity be assumed, that, in the universal scheme of things, everything has been adapted to promote the growth of faith in the soul of man. Whenever the real nature and the legitimate influence of any part of this scheme comes to be perceived, and just in the degree that

this nature and influence are perceived, we should expect this supreme adaptation to appear, and to grow in distinctness and prominence.

In these papers the attempt will be made to show the existence of this relation between mechanics and faith—a relation which, however we may have been taught to ignore its existence, still is one which the foregoing considerations make it evident that we ought to look for, and one which we may find to be of the greatest consequence.

In a book of travel in England by an American scholar, published a few years ago, a book of singular interest on account of the charm of association with which every spot is invested, a quotation is made from an address delivered by Robert Stephenson, on the completion of the central towers of the Britannia Tubular Bridge, across the Menai Straits, as follows :

"Mr. Stephenson said : 'Let them not, any more than himself, and all who have been connected with this great work forget that, whatever may have been or whatever may be, the ability, science, intelligence and zeal brought to bear on the creature's work, it is to the Creator that we should give praise and thanksgiving ; for without his blessing on our works how can we expect them to prosper ?' He fully believed that Providence had been pleased to smile on the undertaking, and he hoped that they all with him would endeavor to obtain those smiles."

Upon this our author remarks : "It is pleasant to see so simple a faith in a mind devoted to so material a science as mechanics."

This amiable comment, so far as it characterizes mechanical science, may, without doubt, be taken to represent the manner in which this science has generally been regarded, or it would be more correct to say has been disregarded, by men who are ranked as thinkers. They whom the world delights to honor with this name, however widely they may differ on other points, would doubtless be found to agree in regarding mechanics as a science altogether material, devotion to which is especially unfavorable to the growth of faith.

And yet no view could be more erroneous. Our teachers, from causes which we will not stop to seek for now, have

here overlooked what was especially entitled to their attention. They have committed the common mistake, and one of which they would consider themselves above all men to be incapable, of looking only at the outside of things, of permitting the thought to rest on that which meets the senses. This error of arresting the thought is one of degree, and in one degree or another it is more general than is commonly imagined. It lies at the bottom of materialism, and hides God from the sight of men.

Mechanical science deals with matter, although, as we shall see, not primarily; but it is not itself material. On the contrary, it is spiritual in its nature and in all its influences. And precisely on account of this singular duality, because while spiritual in itself, it deals with matter in all of its states and forms, mechanical science is also singularly practical, and so is adapted to correct the tendency to erroneous habits of thought and visionary speculations, of what character soever these may be.

The adaptation of mechanical science to meet the fallacies of materialism is so admirable, that the complete eradication of this noxious weed from the fields of philosophic thought may be regarded as its special office.

The effect of mechanical science on our physical well-being, great and beneficent as this is, shall be surpassed in intrinsic importance by its healthful influence on thought, on belief, on morals, and generally on the spiritual nature of man. Indeed, this influence has been widely felt already, although hitherto various causes have combined to prevent its distinct recognition.

This influence of mechanical science is far-reaching. It is of a nature to aid directly in establishing in the mind the solid foundation of faith. Its immediate tendency is to dispel the idea of antagonism between reason and faith, to show that antagonism exists only between reason and credulity, and to vindicate the authority of faith over its own vast region. It shows that faith is not only consistent with, but that it requires, the exercise of the highest intelligence, that all true philosophy leads up to faith, and that the larger and more complete the comprehension of truth becomes, the more absolute faith must become.

These statements, on their first presentation, will naturally be received with more or less incredulity by many persons, whose studies and habits of thought have been on lines far removed from those which they are now asked to follow. In presenting them, the full burden of proof is necessarily assumed.

In these papers I have attempted to maintain the foregoing propositions, and to show the practical application of mechanical science to this higher use. I have endeavored to show the intimate connection that exists between those forms of truth which are known as spiritual truth and those forms of truth which are embraced in the term "Mechanical truth," or rather to show the essential unity of these varied modes of expression of universal truth. I am, however, deeply sensible of the contrast between the greatness of the subject and the necessarily limited character of my treatment of it.

THE UNSEEN.

Above all other employments of a secular character, the study of mechanical science, using the term in its largest meaning, operates to familiarize the mind with the reality and the controlling nature of unseen things.

In this respect mechanical science occupies a peculiar position. On the one hand, it differs from the other physical sciences, in that these terminate in observations on matter itself, and on the other hand, it differs from pure mathematics, in that this contemplates abstract conditions only. When physical science is extended to the consideration of the laws which govern the action of matter, and when mathematics is considered in its material applications, then the two unite, and constitute the various branches of mechanical science.

This science deals, primarily, not with matter, but with force, with the unseen and the eternal; and in its study and its practice it is with this first spiritual reality that men are brought into habitual association.

Among the things which are earliest taught to the student in any branch of mechanics is, to put down on paper imaginary points and lines, which are called centres and centre lines. These are not seen in any construction, but they are the fundamental elements of every construction. They are the points in which forces are properly conceived to be gathered, and the lines along which forces act—in which these are transmitted or resisted. Mechanical structures and movements are primarily represented by diagrams consisting only of centres and centre lines, to which, in the case of moving machines or bodies there are added lines of motion, which represent the successive positions of the centres or of the bodies to which motion is imparted.

These points and lines are objects of purely mental perception. They have no material existence. But in the mind of the designer of any machine or mechanical structure they must always precede the idea of matter,

and determine the order of its distribution or arrangement.

A familiar illustration of this requirement is afforded in the eccentric crank, by which the valves of steam engines are commonly actuated. No eye ever saw the centre of an eccentric, nor the circular path in which this centre moves. Both the centre and its path are hidden in the solid interior of the shaft. But in every diagram of movements derived from an eccentric, the centre and its path are the essential things, the only things pertaining to the eccentric itself which need to be represented.

Following upon these purely ideal points and lines, there comes the study of mechanical laws, in obedience to which force centres in these points, and is exerted or is transmitted along these lines.

These laws, as they are termed for the sake of brevity, are merely the statements or expressions of the effects which force is observed invariably to produce upon matter, under given conditions. We have conferred upon us the ability to ascertain these laws, and to determine their existence as invariable modes of action. We are thus enabled to conform our own purposes to them, and so to make matter, in its various forms in which force resides, minister to our ends.

The investigation of these laws, or of the observed effects that are produced by the action of force upon matter, under the endlessly varied conditions that are found to exist, constitutes the sciences of statics and dynamics, or of the laws of force at rest and of force in motion; including the subdivisions of these sciences which treat of the effects of force at rest and in motion upon matter in its fluid and gaseous states.*

The observation is an obvious one respecting these mechanical laws, that they are universal. They stand calm in eternal unchangeableness. Man is free to obey or disregard them at his will. At the same time perfect obedience to every one, so far as it may be involved in his particular work, is the condition of his success, and this condition he cannot evade in any way nor in the least degree.

* The term "dynamics" is used here in its limited and more familiar sense.

Considering these uniformities in the effects of force as laws, we may say, not only that we must obey them, but also that God has imposed them equally upon himself. Precisely as our work must be, so we find all His works to be, made in conformity with the requirements of physical laws. Whether we consider the sublime mechanism of the universe, or the structure of the most minute organism, or the operation of any natural agency, everwhere we behold the perfect illustration of those principles of construction and operation which must be illustrated also in all our works.

But the mind which has received a development in any degree symmetrical, in which the spiritual senses have been cultivated, or rather in which these have not been obscured, cannot rest here upon the idea of law. Such a mind sees clearly that to do this would be to remain satisfied with a very superficial view of the subject. It can affix no intelligible meaning to the term "natural law" or "law of nature" until it arrives at the idea that what for convenience we express by this phrase is, in reality, nothing less than the changeless will of God—the unvarying mode in which he chooses that His will shall be done, and the mode in which we also must act, unless, either ignorantly or designedly we resist His will, when our purposes must fail and our efforts come to nought. Matter implicitly obeys our wills, unless we require it to disobey the Supreme will. To this will, therefore, in order that we shall accomplish anything whatever by the use or employment of matter, our wills must be completely conformed, so far at least as the occasion calls for their exercise.

We repeat, that the mind, in its healthy development, demands here something to rest upon more substantial than mere verbal conventional expressions, and it cannot stop until it has arrived at this sublime truth.

Now, here is a wonderful thing. Here is a sense in which God lifts us up to Himself, in which we are admitted to share His thoughts, and to give effect to our free wills, by harmonizing them with His will. In every successful mechanical work there is a unity of purpose between us and our Maker.

In the production of all these we become His co-workers,

yea, the voluntary agents by whom He accomplishes His purposes.

When Kepler reflected on the laws of planetary motion which he had discovered or demonstrated, he was overcome with awe, and has put on record his exclamation: "Now, O God, think I Thy thoughts after Thee."

But certainly the same reflection is pertinent in the case of every universal truth discovered by or, correctly speaking, revealed to man. That such a reflection is not always made is only because we are not possessed of Kepler's reverent spirit.

Here, then, at the outset we find a close and vital connection existing between man and the infinite engineer of the universe, and we discovered one respect or particular in which, beyond any question, God has created man in His own image.

We have, thus, in a very general manner, considered two subjects, namely, centres and lines of force and motion, and physical laws; but we have not yet contemplated any reality. We have only observed modes of action. We are now to be brought face to face with the first reality, and we shall perceive it to be entirely spiritual.

Within all the forms of what we call matter, the first reality which our spiritual sense perceives is force. In some unknown way force acts upon matter, as the medium of its manifestation. But what force is, how it acts upon matter, or manifests itself through matter, what is the nature of the connection between them, or what is the essential nature of matter itself, all these are questions to which we can give no answer. We only know that matter, in the various states and forms in which we are acquainted with it, behaves, under the action of force, in a manner that is invariable under the same conditions.

Thus we are confronted with a mystery. The very first reality, the existence of which we are compelled to acknowledge, about which our minds cannot admit a doubt, is something of a nature not capable of being perceived through our bodily organs of sense. We are made aware of its existence only through a spiritual sense. We may indulge in speculations concerning the nature of force,

but we can *know* nothing about it, beyond the fact of its existence, thus revealed to us.

Upon this reality the attention of the engineer must continually be fixed. He is always in its presence, but he cannot behold it. It serves him faithfully, but when he would question it it is dumb. To the engineer force is at once the most familiar of all things, and the mystery of mysteries. With this omnipresent energy, which eludes his senses, and is seen only in its effects, he has to deal continually. Matter has significance for him only as the habitation of force. He is accustomed and required habitually to look within all material forms, and to consider only the forces, in their action and counteraction, which either abide in or are transmitted through these material forms, in their states of rest or of motion.

A familiar illustration of the extent to which engineers have become able to dispense with matter, and yet to secure the forces which alone they require, is furnished in the construction of modern railway bridges.

In these structures the requirement is, that the heaviest trains, moving at the most rapid speeds, and thus transferring their weight rapidly from one point of the structure to another, shall cross spans which often need to be of considerable length, and also that such trains coming from opposite directions, and moving at these speeds, shall pass each other upon these bridges, and that the stresses and shocks thus produced shall be repeated incessantly, and yet that the bridges shall remain entirely safe.

We glide over them, and they are so firm that the change in the reverberation from that which is heard when the train is moving over the solid ground is hardly observable, but when we look at the structures, we see that, as compared with bridges of former times, which were intended to bear only insignificant weights in addition to their own, they seem almost like spiders' webs.

In the construction of these bridges, every stress that can come upon them is exactly known, and is met in the most advantageous practicable direction, and with a resistance equal to several times its greatest possible intensity. That material is employed in which the resisting force is known to be contained in the highest degree, and this

material is so disposed that not a pound of it is wasted. Each member of the structure has its special function, and is designed and proportioned in such a manner, that the amount of resisting force residing in every part of it bears a uniform ratio to the amount of stress that can come upon such part.

The history of the growth of engineering skill, and of the advance in our knowledge of the action of force, and of the means and methods of employing and resisting it, which have made such structures possible, is more wonderful than the stories in the "Arabian Nights;" and this because we have always to realize the amazing fact that this history is true, and its truth constitutes the supreme element of wonder, which in the tales of oriental imagination is lacking.

The most comprehensive definition of force that men have been able to frame, and one which seems inclusive of all its observed effects, is a cause producing, or tending to produce, motion. Although this appears to be the utmost that we can know about it, still its effects have been made the subject of grand generalizations.

It has been established that force is capable of a great variety of manifestations. These appear as potential or as dynamical energy, as light, as heat, as electricity and magnetism, and as chemical and vegetable and vital activity. Force has been shown to be indestructible, and to exist in a total degree or amount that is not capable of variation. No existing force can ever cease to manifest itself in some way. It passes freely from one form of manifestation to another; its disappearance in any one form being attended by its appearance, in precisely equal amounts, in other forms.

Force is the sole cause of physical phenomena. All rest of matter, and all uniform motion, which is rest in its true sense of undisturbed condition, result from the equilibrium of counteracting forces; while changes from a state of rest to one of motion, or from one degree of motion to another, result from disturbances of this equilibrium, and tend towards its restoration.

The beginning of the cultivation of mechanics, in its

various branches, as the science of force, marked an era of peculiar importance in the progress that mankind is making in civilization. The recognition of force, as a spiritual reality, manifested through the medium of physical forms, which is made in this science, required a certain degree of spiritual insight, and constituted the first advance made by men from that primitive perceptive condition, in which thought was limited to these forms themselves, as these are disclosed to us through our physical organs of sense.

This recognition of force has been the first step towards the scientific recognition of all spiritual realities, which are manifested to us through the same physical medium, and of the infinite Being in whom all these consist. And because it was the first step in this advance towards the perception of all spiritual realities in their unity, it was by far the most important one, as upon it all succeeding steps must follow. It was also the step which was most slowly and gradually taken, and which it was necessary should be dwelt upon for a considerable time, in order that the mind might be prepared for those which are to follow it, in the natural progress of thought. Thus by mechanical science the door has been opened to the whole realm of the unseen.

At present, scientific thinkers generally are accustomed to stop with the contemplation of force. In point of fact, as will be shown, force is not to be generically distinguished from the other spiritual realities of truth, love and beauty, which are equally manifested to us through the same universal medium of the physical creation, and of whose existence we are made aware through a similar mode of revelation. But from the point of view to which men are now by their education generally confined, force appears to be the only spiritual reality that is manifested to us in this way. It is the only one with which we are conceived to be immediately and practically concerned, and so it is to-day imagined to be scientific to limit the attention altogether to force.

This marks the stage of mental or spiritual growth at which mankind has arrived. In this stage, scientific thought is quite occupied with this first unseen reality, to

the contemplation of which, in its grander features, men are only beginning to be accustomed, and which must be employed by us in all the activity of our lives. In reality, our connection with force, and our dependence upon it, are not any more close or more absolute than are our connection with, and our dependence upon, all spiritual realities; but our relations to it have hitherto seemed more palpable than those relations do which require for their discernment a still more spiritual vision.

Generalizing from the observed uniformity of the action of force, men have formulated the expression, "*law.*" In returning to this subject, the object is to call attention more pointedly to the disposition, now commonly to be observed, not merely to rest upon this mere word, but to give to this word in some sort an objective character, to regard it as if it expressed some substantive reality; when in fact it expresses and can express nothing except the uniform mode of action of a Being.

This disposition presents an instructive phenomenon. Scientific minds are sometimes said to be destitute of imagination, but it will be difficult to find a work of the human imagination that is worthy to be ranked with this creation. The worship of law is scientific idolatry; or the adoration of an image created by men themselves, to satisfy an instinctive want.

We begin here to observe the relation that the physical creation bears to the human race as its educator. Its office as our teacher respecting all material forms of beings, and also in the development of our senses, and of all our physical and mental powers and activities, which are employed in the acquisition of the knowledge of these forms of being, and in the utilization of them which we have evidently been intended to make, all this is of course obvious.

But beyond this, we already perceive that it is from the manifestations of it in the physical creation that we obtain all our knowledge of force, and receive the prodigious increase in our spiritual development that this knowledge brings to us. This may be termed "the ministry of force." As we advance in this discussion, higher and

higher exhibitions will appear of the educational work which the universe by which we are surrounded has been adapted to perform. These educational influences we shall find to be addressed to, and to employ and develop, every mode of our spiritual activity.

An important lesson may here be noted. The argument from analogy rests upon the unity between spiritual and physical being, as proceeding from a common source. Upon the assumption of the existence of this unity, and upon the evident fact that spirit is a higher order of being than matter, the physical creation affords strong presumptive evidence of the immortality of the soul.

A remarkable identity is observed between matter and force in this, that the former is, like the latter, indestructible. While subject, like force, to endless changes of state and form, no particle of matter can cease to exist. This is established by universal and familiar proofs. Then, *a fortiori*, the soul of man, though likewise changing its state, cannot cease to exist.

While to uninstructed minds the constantly present phenomena of decay and disappearance of matter suggest by association the idea that our conscious being may cease in like manner; it is deeply interesting to observe that, on the very first step towards a knowledge of physical truth, this suggestion becomes dissipated, and the true analogies of immortality appear in its place.

Thus from a consideration of the known harmonies of the creation the conclusion is compelled, that the idea of the cessation of our being in annihilation, that idea which fills us with distress, from which we instinctively recoil, is, like a mistaken mechanical conception, only a figment of the brain, which represents no reality, a shade that vanishes at the first dawn of light; and that the opposite idea of our immortality, the idea to which we instinctively cling, which fills the healthy soul with gladness, which is the balm for all wounds, and in which is found the solution of all mysteries that would otherwise darken our earthly being, is true. It cannot be that spirit perishes, and matter and force endure.

THE CRITERION OF TRUTH.

In the preceding paper, I have attempted to give a brief exposition of the true nature of mechanical science. We are next led to consider, in the same general manner, the character of the influence which this science is adapted to exert.

It will be found, on making proper inquiry, that mechanical science has been the most important auxiliary to verbal revelation, in disclosing to mankind the real criterion of truth.

In this work, two things are necessary. Not only must the criterion of truth be shown to men, but in addition to this the minds of men must be prepared to admit it. Men must be educated to recognize, to accept and to appeal to this criterion, as the sole and infallible test of all truth whatever.

For the attainment of this result, much more, indeed, is required than mere education, as this term is commonly understood. A radical change needs to be effected in the tendency and disposition of our nature. This change requires for its accomplishment a strong agency, operating through a long period of time, and producing its effects in an almost imperceptible manner. Mechanical science is such an agency. This change on the character and diretion of thought is, in an eminent degree, the work of the science of force.

The problem of the ages has been this: How is truth to be distinguished from error? What test shall be applied to the notions that we form in our minds, in order to determine whether or not there exist any realities to which these notions correspond? How is it to be determined what we shall, and what we shall not believe.

With respect to all beliefs, to those of a physical and those of a spiritual nature alike, the ancient heathen world, if we except the geometry and mechanics that were known to them, and the influence of which we have reason to believe was very limited, knew of no criterion except

human authority. The same is true of all heathen races, ancient and modern. We limit our view, however, to the most intellectual of all. In the teachings of the great minds of the Grecian race, there is presented a curious medley of half-inspired truths, mistaken conceptions and frivolous absurdities, all of which were received by the disciples of the philosopher with the same implicit belief, on his authority alone. *Ipse dixit* was the only proposition that needed to be proved.

Under the conditions of heathen society, this reliance on human authority was a logical necessity. No inquiry had been instituted respecting the source of truth. Human thought had not ventured so far as this. The human mind was the only source of beliefs. These were wholly derived from human teaching. So it will be perceived that human authority afforded the only criterion of their correctness. The mind must always be satisfied by an appeal to the source of its belief. Beyond this there can be no appeal.

Any departure from this established usage involved a radical change in the mode and direction of thought. Such a change must be effected by some means, as the essential pre-requisite to a true civilization.

This change is from that habit of thought in which the mind is satisfied by an appeal to the source of its belief, whatever, as the result of previous influences, that source may happen to be, to that contrary habit of thought, in which the mind seeks for and recognizes the single source of truth, which then becomes the only source of its belief, and to which, in all cases, its appeal is directly made. We shall see that the source of truth, thus either consciously or unconsciously recognized, can be nothing less than the infinite Being.

This change in the habit of thought is still far from being completely accomplished. It is resisted by subtle and powerful influences. It advances so slowly that it seems sometimes to retrograde. On the whole, its progress has been so partial that, when one contemplates the extent of that which is yet to be made, it seems to be only just begun.

The various influences which oppose this transition from

the one to the other of these modes of thought all have their root in a common weakness of our nature, which manifests itself in two apparently opposite ways. These manifestations are a disposition to assume and to submit to human authority in matters of belief. These are essentially the same disposition, the direction of its exhibition being determined by accidental conditions. Whichever of these forms this disposition may take, it shows its identity by appearing continually in both forms and in equal degree in the same individual. The severity with which submission is exacted from inferiors always corresponds precisely with the servility with which it is rendered to superiors.

In whichever way this weakness may manifest itself in any individual, or in any organization, whether in the disposition to assume authority over belief, or in the disposition to submit to such authority, in either case alike it involves an inability to perceive that, since the human mind cannot be the source of any truth, so it cannot be the legitimate source of any belief.

When, however, this fundamental truth has been apprehended, then it at once becomes evident that in matters of belief all men stand on an equality, and have in this respect no relations towards one another, but the relations of each individual are immediately and directly with the source of truth. It also becomes evident that in this respect no distinction is to be drawn between physical and spiritual truths. The relations of the individual to the infinite source of all truth are just as direct and the absence of all relations towards his fellow men is just as complete in the case of spiritual truth as they obviously are in the case of physical truth.

The clear perception of the immediate and exclusive relation of each individual to the source of truth renders it impossible for men either to assume or to submit to authority in any matters of belief whatever, for it is then obvious that all assumption by man of authority over either the physical or the spiritual beliefs of his fellow men is absurd, and the exercise of such authority is a usurpation.

This fundamental change in the mode and habit of

thought has been, and still is, and must continue to be until such change shall be universally made, dependent for its accomplishment very largely on the influence of mechanical science.

The peculiar adaptation of this science to the task of delivering the mind from bondage to human authority, and of making the assumption of such authority ridiculous in the sight of all men, becomes manifest when we consider the nature of its methods. These methods are simply experiment and observation. In common with all true science, mechanical science has this characteristic, that its conclusions are derived from and are brought directly to the tests of experiment and observation, and are open to free criticism.

Repeated experiment and observation constitute the only mode in which the teachings of mechanical science can be either established or assailed. The names of eminent discoverers or inventors are held in peculiar honor, it is true, but this is only because the truth and the value of their discoveries and inventions have been confirmed by every fresh investigation or application of them. For this reason alone these have received the acceptance, and the minds through which they have been revealed have received the homage, of mankind.

All experiments in mechanical science have for their object to determine the action of force under given conditions, or, the behavior of some form of matter under the action of force. The essential nature of these acts of experiment and observation seems hardly to have been realized. It is of the first importance that their real character should be clearly apprehended.

They are, in reality, nothing less than appeals made in the only possible way, and in the way obviously appointed, directly to the source of truth, to the Divine Being, who through this method reveals to man the changeless modes of his beneficent activity, and also the modes in which man may coöperate with this activity.* Through ways of

* Those who cannot see experiment and observation to be such appeals to the Deity will, nevertheless, agree in regarding them as appeals made directly to nature herself. But this is an expression of which the only intelligible meaning is the one given in the text.

human devising the ancient augurs pretended vainly to inquire the will of imaginary divinities respecting particular human affairs. Now, employing in all sincerity the methods of divine provision, man seeks to learn the will of God, in its uniform physical operation, and how he may direct his own will in conformity with it. The knowledge gained by these methods constitutes mechanical science. In the light of the present day, it is clearly seen that the intrusion of human authority here would be a profanation.

But this has not been the case very long. This is a mental illumination, at which the civilized portion of the human race has only arrived quite recently. Until mechanical science had its birth, only two or three centuries ago, human authority continued to be the sole arbiter in all matters of physical belief. No other criterion of physical truth had been so much as imagined. From all antiquity submission to human authority in matters of physical belief had been the unquestioned habit of the unlearned and the learned alike.

The consequences of this error have been far reaching. In contemplating them, we first observe the intimate nature of the connection that exists between physical and spiritual truth, a connection more intimate than any mind is probably able to conceive. In the darkness of the middle ages, the same deep obscurity rested upon both. While the real source of physical truth remained undisclosed, the growing tendency of human thought was to hide also the real source of spiritual truth. While submission to human authority was universal with respect to physical belief, it was not possible that the contrary teaching of the Bible respecting spiritual belief could be comprehended. Opposite habits of thought respecting these two classes of truth could not coëxist. In this fact, in which once lay the despair, now lies the hope of the world.

The habit of servile acceptance of the dictates of recognized human authority inevitably extended from physical to spiritual beliefs. In this habit is found the fundamental reason, why the teachings of the Christ came, through century after century, to be more and more

buried under human traditions and requirements, why the ultimate appeal came more and more to be made to human authorities, on all questions both of faith and of conduct, and why at last the Christian Church came to repeat the phenomenon of Judaism in its last age, and to present the almost complete extinguishment of Divine truth in human defilement ; as human authority became more outrageous in its exactions, and submission to it became more degraded in its servility.

Obtaining the position of general spiritual supremacy in Western Europe, and maintaining this position for many centuries, under these conditions of thought respecting physical beliefs, and when the source of physical truth was utterly unrecognized, it was unavoidable that the Church of Rome should come to hide, also, the real source of spiritual truth, and should limit appeal to human authority also in all matters of spiritual belief. Thus this amazing development of human authority over the consciences of men followed as the necessary consequence of the universal error of submission to human authority in respect to physical belief.

It is true respecting most great movements that their origin is obscure. Fundamental causes must be in operation for a long time before their effects begin to appear with distinctness. Mechanical science is probably to be regarded as one fruit of the Reformation, yet Galileo owned allegiance to the Church of Rome. The spiritual awakening was abrupt, and brought conflict and desolation in its train, and was followed by a strong and thus far a permanent reaction. The mechanical awakening was insensible, but has been steady and full of benefactions.

The vital question common to both was, whether human or Divine authority should receive the submission of the human mind. A century after Luther and Zwingli, the issue was at last distinctly joined between the dictum of Aristotle and the demonstration of Galileo, on the physical question, whether the velocity of a falling body did or did not vary according to the weight of the body. When this issue had been decided, then also the enormous and hoary structure of spiritual pretension was undermined, and the work of emancipation from all forms of human

authority was really begun. Such is the unity that connects physical and spiritual truth.

This event marks the beginning of the great transition in the mode and direction of thought, so far as relates immediately to physical belief. It was more than an event. It was a prophecy. It foretold the time when thought shall be free, when human authority shall be driven out of the temple of spiritual truth as well as out of the temple of phsical truth, when, universally and forever, for the knowledge of all truth, whether in its physical or in its spiritual forms, man, in his individual freedom, shall appeal to God alone.

Even yet, however, such is the influence of conventional modes of education, men are not ready to recognize the unity of all truth, nor the common source of all well founded belief.

On the one hand, science, confirming its view to incomplete data, is unable, in what it terms matter, to see the principal thing, to behold the revelation of God.

On the other hand, theologians fail to recognize the equal sacredness of all truth, as truth, whatsoever its form may be, and so they too are unable, in any proper sense, to behold in all physical being the infinite and universal presence.

Both have apparently yet to learn, or at least to realize, the great fact, that religion and philosophy are manifestations of the same truth, expressions of the nature of the same Being, between whom and each individual the relation and connection are immediate and direct.

Meanwhile the insidious disposition to assert and to submit to human authority is still seen, and its despotism is felt, in a greater or lesser degree, in all human systems of thought, and especially in religious systems. Its presence in the latter reveals the admixture of the human element, and pretty accurately indicates its proportion.

It may be well to dwell somewhat longer upon the methods of scientific inquiry. The more familiar the mind becomes with these methods, the better prepared it will be to give proper consideration to the views which have already been presented, and especially to those which are to follow.

Before proceeding further, however, attention should be drawn to the distinction which exists between the real nature of all scientific methods, as this has been exhibited, and the grand consequences that have followed from the adoption of these methods, and that must still more largely attend their employment in the future, on the one hand, and, on the other hand, the frequently limited purposes, and even the contrary disposition of individual inquirers. These often fail to recognize, and even deny the existence of the God to whom, in fact, they continually appeal. This distinction is an obvious one, and cannot fail to be observed by every candid reader.

All true science must be destitute of the reverential spirit, in the sense in which this term is commonly used. If a belief is venerable, that fact tends to raise the presumption that it is unfounded, since the beliefs of more ignorant ages have generally been found to be so. The authority of Scripture is inadmissible, and this with evident propriety; for the subject of inquiry is some form of physical truth, and, on any statement contained in the Scriptures that comes fairly within the scope of physical inquiry, their claim to be the Word of God is itself on trial. Before this test of agreement with the facts in nature, every religious system of human origin has gone down, and must inevitably do so, since these systems are sure to teach, as essential portions of their creeds, some things that are proven by science to be false.

Science is not less destructive of human creations in her ministers than in her methods. Here is no priesthood, nor ordination, nor privilege, but a pure democracy, where the right of private judgment is exercised without restraint, and admission to the mysteries is open to all on the same conditions.

The observations and experiments by which knowledge is advanced are repeated by independent inquiries, under varied conditions and by all known methods, before the results can be accepted as established facts. In this way, from age to age, experimental science in all its branches makes its slow but certain progress. The discoveries of one generation become the familiar truths of the next, are taught to children, are turned to account in the arts and

industries, and so are continually adding to the occupations, to the comforts and to the intelligence of mankind.

The discoveries and inventions, or properly speaking, the revelations, which together constitute mechanical science, may be grouped under four general heads. These are:

1st. The laws of force and of motion ;

2d. The operation of these laws, in their application to matter in its various forms and states ;

3d. The forms and properties of matter itself ; and

4th. The conception of modes in which all these, in the infinite variety of their combinations, are found to be practically applied in nature, or in which they can be practically applied by man.

The weight or pressure of the atmosphere, or the mutual attraction of the earth and the atmosphere for each other, and the amount or degree of this attraction, is a phenomenon that belongs to the second of these groups. The discovery of this attraction was one of the earliest discoveries in modern mechanical science. A brief account of it will fitly illustrate the method in which the facts of this science have been established ; or the form and mode of the appeal that, in all experiments of a mechanical nature, whether these are successful or unsuccessful, is made to the infinite source of truth, and in which the revelation of all physical truth is given, in answer to such appeal.

So far as we have any knowledge, the idea that the atmosphere might have weight or exert a pressure never occurred to the philosophers of antiquity. During the earlier period of the revival of learning in Europe, the question was occasionally discussed, and was always decided in the negative. No such pressure could be felt. All experience and sensation seemed to be opposed to the idea of its existence.

Men were everywhere using their rude devices for raising water in pumps, without the least idea of what they were doing. The action that was taking place before their eyes never entered into their comprehension. If any one had told them that, in raising a pump bucket, they were

lifting a portion of the weight of the atmosphere from the water under the bucket, so that the excess of this pressure, exerted on the surface of the water in the well, would force the column of water in the pump barrel up after the bucket, there were centuries when such a teacher would have been in danger of being burned up.

This, with all similar phenomena, was explained by the dictum, that nature abhorred a vacuum. This nonsense passed for science through many an age. It is interesting to recall the long period, during which this was assumed as an axiom that no one dared to question. But are there not now conventional absurdities, from which we must ourselves become free before we can be entitled to smile at that one? And are we not ourselves surrounded by truths, which in reality are as palpable as that of the weight of the atmosphere, but which our eyes have not yet been opened to see?

The raising of the question, whether the atmosphere might have weight, was itself a notable event, as marking the beginning of scientific inquiry. But an experiment was tried, which was long regarded among the learned as settling this question in the negative. This experiment consisted in weighing a bladder, when distended with air, and when empty. No difference in the weight could ever be detected.

The power of observation, which was to be developed only by the study of nature, did not then exist, that would enable men to detect the fallacy in this experiment. This fallacy lay in the unobserved fact, that the bladder was filled with, and immersed in, the same fluid. Whether full or approximately empty, it always displaced, in addition to its own proper bulk, very nearly the same weight of air that it contained. A similar experiment would just as well prove water, or even mercury, to be without weight. So this great fact was yet hidden from men. Copernicus, Galileo died without the sight.

In endeavoring to raise water from a deep well in Florence, it was found possible to lift it only about thirty-two feet, which led Galileo to observe, that nature, evidently, did not abhor a vacuum above thirty-two feet. Dying, Galileo commended the investigation of this subject to his

pupil and successor, Torricelli. The reflections of Torricelli led him to the conviction that the atmosphere must have weight, and that it must be by its pressure that the water was caused to rise in the pump barrel. In considering how this question might be tested, he at last thought of mercury. This substance, being between thirteen and fourteen times heavier than water, would be caused by the same pressure, if it existed, to rise only about thirty inches. So he reasoned that, by the employment of mercury, the effect of this pressure might be observed in a glass tube.

It is interesting to imagine the feelings of this philosopher, when preparing for this experiment, which was so remarkable at once for its simplicity, its conclusiveness, and its importance. It was almost as simple as that of standing the egg on its end, yet no other finite mind had conceived it. Was it with trembling expectation, or in the calmness of conscious strength, that he filled with mercury his glass tube, four feet in length, sealed at one end, placed his finger over the open end, inverted the tube, plunged the open end in a vessel half filled with mercury, and then—removed his finger ?

What were the emotions with which he saw the column of mercury fall, and after completing the oscillations produced by its momentum, stand at a height of between twenty-nine and thirty inches, in equilibrium with the pressure of the atmosphere on the same area of surface of the mercury in the vessel ; or with which he realized the fact that the glass tube above the column of mercury enclosed the absolute void, then first obtained by man, since only approximations to it could be reached in the pump barrel, and which was ever after to be known as the Torricellian Vacuum ? And what would his emotions have been, if he could have imagined, what, indeed, no one can adequately conceive, the influence that this discovery was to exert, in promoting the industries and the civilization of his race ?*

* Belief in nature's horror of a vacuum died hard, however. The account of the repetition of Torricelli's experiment by Pascal,and his correspondence on this subject with Jesuit Fathers, in the 4th volume of his works, Paris ed., 1819, is delightful reading.

The discovery of the pressure of the atmosphere was one of those discoveries by which the boundaries of our knowledge have been enlarged in an unusual degree. It was a radical discovery, and out of it there have sprung an endless series of discoveries and inventions, which, while they have contributed in an incalculable measure to the material welfare of man, have, at the same time, added still further to the extent of his knowledge and to the power of his understanding.

We here close the present consideration of the subject of the criterion of truth. In subsequent papers it will be resumed, and considered from other points of view. In those connections we will trace more particularly the revelation of mechanical constructions.

SUPERSTITION.

Mechanical science is the angel whose spear has vanquished the demon of superstition. The source of this power in mechanical science is no secret. It is the science which penetrates to the causes of phenomena. Force, in the various forms of its manifestation, is, as has been observed already, the cause of all phenomena whatever. But force is unseen. It is hidden from the apprehension of rude and ignorant races. To them nature is full of mysteries. Their minds are without guidance in their imaginative or form-constructing activity. Every phantom becomes to them a reality. They people the earth and air with spiritual representations of their own dispositions, and tremble before their conceptions of natures like their own invested with unlimited power. Their minds become the abodes of superstition and credulity.

The dawn of light on this darkness is the development of the knowledge of force, in its unvarying and beneficent activity. This is not the full light; it is only the dawn.

Mechanical science is a science that diffuses itself, and exerts a wholesome influence throughout the masses of every civilized society, even where the very term "scicence" is unknown. It is the foundation of what is called "common sense," which is an orderly habit of thought and a disposition to look for natural and reasonable causes for phenomena.

Confining our attention to the most enlightened nations of the world, we observe that, before the general cultivation of mechanical science, unlimited credulity made men everywhere the victims of ghostly authority. We see superstitions and delusions controlling the most cultivated minds, and, springing out of these, we see irrational and erratic habits of thought prevailing, with little check or guide.

Although there is still an abundance of all this to be seen, showing at once the incompleteness and the need of the work of mechanical science, still the influence already exerted by this science, and the results accomplished by it,

in substituting, in place of these vagaries, reasonable and correct methods of inquiry, and habits of thought based upon and guided by fixed principles and laws, have already been greater and more important than can be adequately conceived. Illustrations like the following indicate both the extent and the fundamental nature of this influence.

Institutions of learning do not now esteem relics as their most precious possessions. Men of science do not now make a business of calculating nativities. Courts of justice do not now gravely engage in the trial of witches. But when mechanical science had its birth, in the age of Galileo and his successors, they did all these things. These and like absurdities, which only about two centuries ago were regarded as so serious, mankind has outgrown wherever mechanical science has been cultivated, and largely through its influence.

The word "superstition" is properly employed to express any unfounded belief, and the disposition that accepts such beliefs with readiness is properly called superstitious. The practical way in which mechanical science goes about the work of destroying this monster, wherever it finds it, is readily exhibited.

Whatever be the particular direction that thought may take, human nature always manifests itself in essentially the same way. So it is the case in mechanics, as well as in other branches of science, and in speculative philosophy, that vagaries, more or less visionary, are appearing continually. In all these departments of thought alike, it is constantly occurring that absurdities are being urged upon the attention of men. This is a general manifestation of the perverse tendency of thinkers, so-called, to be captivated by the work of their own imagination, and to proclaim this as the truth.

But there is a wide difference in the credence that these mechanical and philosophical speculations command. Mechanical science possesses the important advantage of being able to bring all conceits that appear in her realm sharply to the test of experiment. "How will it work?" is the pitiless question, and but little interest can be

aroused in any supposed invention until this question has been satisfactorily answered.

One occasionally hears of a person who is cherishing a pet mechanical conceit. It is opposed to mechanical principles; but he is quite innocent of these, and, as they antagonize his supposed invention, he cannot admit them into his mind. He is sure of the soundness of his plan. It takes complete possession of him. Some one is induced, or more probably a number of persons together, to construct a machine which shall at the same time demonstrate the invention, and show the inventor to the world.

A trial is made, and lo! as was the case a few years ago with a propelling apparatus that was constructed on what was represented to be a new principle, and which, when it came to be tried, was found to produce no effect in moving the boat in any direction, the whole thing vanishes into thin air. And the reflection of the thoughtful observer is: "What a pity that the same disposition cannot be as quickly and effectually made of the vain speculations which, under the name of philosophy, are continually wearying the ear." Here, for want of checks that can be promptly applied, we see advocates of all sorts of theories doing serious harm by confident assertions and plausible reasonings, which one experiment, if only it could be fairly tried, would dissipate forever.

Mechanical science operates powerfully, however, to reach absurdities of the latter character also, by its indirect influence and the general habit of thought that it developes. It thus becomes, in the largest sense, an important educator, and one whose influence is felt throughout the masses of society.

Men who, in any department of mechanics with which they are acquainted, observe continually the natural adaptation of means to ends, become accustomed to the uniform operation of unvarying laws, and see idle conceits, formed in contravention of these laws, continually exposed and thrown aside. In this way they insensibly acquire a stability of character and correct habits of thought, and are not likely to be led away by delusions of any sort.

They observe that in mechanics there exist fundamental principles which must be regarded, and they naturally

look everywhere else also for general requirements of a corresponding nature. They become accustomed to reasoning with some degree of precision, and vague generalities have little or no effect upon their minds. They consider, correctly enough, that absurdities are quite as likely to arise in other departments of thought as they are in mechanics; and they come to be on their guard against specious novelties, in whatever form these may be presented.

In a later paper the opportunity will be found for giving to this line of thought a more particular direction. We may properly observe here, that, at the present day, when free thought is coming to be more and more general, and the minds of the masses of men are awakening to an increased activity, it is certainly a gratifying feature of the case, calling for sincere congratulation, that there exists a conservative influence so strong, and at the same time so all-pervading, as mechanical science has shown itself to be.

It is difficult to draw a line between the destructive and the constructive forces of mechanical science: just as it is difficult to distinguish between the effects of light, in dissipating the phantoms and chimeras that filled the darkness, and in revealing the world around us in its reality. So also the direct and the indirect influences which are exerted by this science blend insensibly with one another. It must be sufficient, therefore, merely to call attention to those distinctions, without attempting to observe them strictly in our argument. These being borne in mind, all the beneficent influences of mechanical science may properly be considered together.

THE JUDICIAL SPIRIT.

In a former paper I have endeavored to show the influence of mechanical science, in combating one weakness that is common to men, namely, the disposition to assume and to submit to authority in matters of belief.

We have now to observe an influence of an equally healthful character, that is exerted by this science with equal force in resisting another weakness more subtle, and if possible more dangerous, than that.

As in that case, so in this also, the work of mechanical science will be found to be, not negative merely, but affirmative as well. In both alike, it tears down only that it may build up. There we found this science to establish individual freedom of thought, and direct access to the infinite source of truth. Here it will be found developing that spirit or disposition by which only it is possible for truth to be apprehended.

Many minds are found, even among men of intellectual power and influence, which are accustomed, in a greater or lesser degree, to look within themselves for the criterion of truth. Such persons seem irresistibly inclined to believe that because anything appears to them to be true, therefore it *is* true. They would hesitate to declare this in so many words. Indeed, they would most likely be offended, if their real mental operations were exposed, even to themselves. But in reality they can never bring themselves to see that, although a certain idea may appear to them to by true, that fact in itself does not afford the least reason for concluding that it *is* true; that truth must be established by evidence existing wholly outside of their own minds; that, in balancing the reasons for and against any belief, the belief itself, even though it be held by themselves, ought to weigh nothing.

This weakness is exhibited by different minds in various degrees. Indeed, it is doubtful if there lives a man who is entirely free from it, who in examining a question about which he already holds a belief, can in all cases,

bring to the consideration of that question a perfectly judicial spirit, can distinguish absolutely between the proper evidence and his own prepossessions, and can form an unbiassed judgment. Many men, it is true, are found capable of forming singularly impersonal judgments on many questions, but we shall catch them somewhere. On some side of their minds prejudice is sure to appear. The necessity for ignoring all prepossessions if the truth is to be seen, if the idea formed in the mind is to conform to the reality, is obvious; but who is there that can always do this?

There are cases in which this weakness appears in its extremest form; in which it is obvious that, habitually, the necessity is not perceived for bestowing much attention upon external evidence, and still less for giving weight to the views of others; but the mind is satisfied with the short train of reasoning already stated; the individual being probably unconscious of his weakness, may, willingly blind to it.

It is interesting to consider what must be the major premise of the syllogism, from which a conclusion of this nature can be drawn. This is, that, so far at least as relates to the question at issue, my knowledge is infinite, all things in reality are just as they appear to me to be. It is only on this general assumption, that any one can say or can feel: "this appears to me to be true, therefore I am satisfied that it is true."

The fact of this common weakness of our nature explains why so little progress towards the establishment of truth is usually made by discussions, and why the curious result is almost always observed to follow from these, that each side is more firmly fixed in its own belief than it was before.

This infirmity is one of the principal causes of sectarianism in religion. The division of the Protestant Christian world into sects presents a most interesting phenomenon. A survey of the multitude of religious sects that have appeared since the Reformation shows that, at the bottom, modern sectarianism has been a natural extreme reaction from the bondage to spiritual authority, and to enforced uniformity of belief, which had been the condition of the

same races for many centuries. At the same time, the tendencies to superadd human inventions upon divine truth, to express that truth in formulas which reflect the limited and perverted conceptions of it that are formed by men, and to exercise and submit to spiritual despotism, have shown their universal characters, by appearing also in degrees more or less marked in every Protestant organization.

The sectarian feeling is that disposition which seeks after distinctive peculiarities of belief, and which cherishes these points of difference with especial zeal. Sometimes this feeling finds its excuse in attributing undue importance to particular truths. Sometimes it is seen in attachment to a cherished notion, which, in reality, is immaterial, or even unwarranted. Most Christian sects show the enduring impress of some commanding but necessarily imperfect mind, which for its adherents in some degree takes the place of and hides the Christ. There are cases in which the distinctive peculiarity of the sect, about which its members are strenuous above all other things, is something very whimsical.

Sectarian feelings are the opposite of Christian feelings. Sectarianism is directly at variance with the unity which the Christ so earnestly prayed might exist among his disciples. The observations which are suggested by sectarianism are therefore not observations upon Christianity, but upon its opposite.

When once a religious sect has been formed, multiplied and sometimes extensive associations and interests become involved in the maintenance of its separate existence. These interests and associations are, of course, quite distinct from any logical reason for the separate existence of such a sect. Nevertheless, they sometimes become the principal motives for its continuance.

These interests and associations impel to strenuous, and in some cases to extreme, defences of the distinctive tenets of the sect, although these tenets may have been formulated under conditions of thought which are now obviously imperfect, and which, in developing to a rounder and fuller spiritual life, Christians have outgrown, or are outgrowing.

Upon a comprehensive view of this subject it becomes apparent that sectarianism belongs to the period of spiritual childhood. It presents every characteristic of this age. In this earlier period of human development, out of the conditions of which it sprang, and to which it has been, and still is, although in a continually diminishing degree, adapted, sectarianism has had its essential mission to fulfil.

It exists, however, only as a step to something higher. Antagonism, which is of the earth, earthly, must pass into concord, which is from heaven. The human must give place to the divine. Mature spiritual life rises far above many trifles which have appeared of such solemn importance.

The tendency to sectarian division has passed its culminating point. The current of Christian feeling is now clearly in the opposite direction. The antagonisms of a former age are something that christians at the present day can only with difficulty form an idea of. The period of Christian unity is evidently approaching. All the novel influences by which men are now surrounded, and of which they are only partly conscious, are insensibly operating to bring the minds of individuals, in the exercise of their free activity, into a state of charity and harmony, with regard to spiritual truth.

Among the influences which are tending to liberate the mind from bondage to all the inventions of men those that are exerted by mechanical science must be accorded a prominent place. That which may be termed the external influence of this science, or that influence which it exerts in breaking down the barriers that have separated and isolated from each other the various races of mankind, with the immediate effect of destroying prejudices, enlarging the range of thought, multiplying human relations, and broadening human sympathies, all this work of mechanical science is, of course, obvious.

But deeper than this is its influence upon thought. Not only has it contributed to make thought free, but its influence is exerted even more strongly to give to free thought its proper direction. Anticipating in some degree the conclusions of a subsequent paper, we may observe

here that mechanical science gives precision and definiteness to the use of language, substitutes ideas of uniformity in place of those of caprice, and destroys the delusion that truth is to be arrived at by speculative methods.

There are no sects in mechanics. No warring schools contend here, as in medicine. No conflicting views are put forth and battled for in mechanics. And why? Because mechanical science appeals at once to the infallible criterion of truth. "Thus saith the Lord" is the only declaration to which it yields its assent. For the most part unconsciously, but none the less really on that account, and none the less trustingly, the engineer listens for the voice of God. Whenever this voice is clearly heard it is recognized with gladness, and thus we have MECHANICAL SCIENCE.

The power of mechanical science in correcting false methods of thought lies partly in the fact that all its conclusions *must* be based on evidence which exists wholly outside the individual. It appears, indeed, to the superficial observer as if the very weaknesses the nature of which has just been exposed were especially liable to appear in mechanics. This, however, is because in mechanics absurdities are always detected, and are shown in their true light. In other departments of thought these often pass for wisdom.

Before the tests of truth that mechanical science employs, all preconceptions and prejudices, all influences of association or of education or habits of thought, all mere words, which, however established by usage, or imposed by dogmatic authority, in reality mean nothing, all pride of opinion or of place, all conceit as to anything that for any reason may strike the mind favorably, all these things that so darken the understanding, and render it incapable of apprehending truth, or of giving to different truths their proper relative importance, are at once and forever swept away.

The individual may, and often does, cling to mechanical delusions, in which case he also disappears. The practical application of an idea in a working machine frequently destroys in an hour the cherished fancies of years. From this crucial test no inventor can escape. It searches, not only his work, but also himself. It reveals at once his

genius, his knowledge and his disposition. The latter is generally the real thing, or at least it indicates the possession or the want of the real thing.

No one who conceives of himself as already knowing anything that he has not profoundly and experimentally studied, no one who brings to his work the disposition that has been described in this paper, can ever either produce anything or learn anything in mechanics. He exemplifies the proverb: "Though thou shouldst bray a fool in a mortar, among wheat with a pestle, yet will not his foolishness depart from him."

A good illustration of this disposition recently came under my observation. A legal gentlemen of an unusually acute and discriminating mind, but who, of course, had been trained to see the truth only in his side of a controversy, conceived himself to be an inventor, and, of all the foolishness in the world, he hit upon that of making railway cars to run upon skates instead of on wheels. He actually obtained a patent for this invention, and then proceeded to urge it upon the attention of engineers.

The case was an interesting one from a psychological point of view. Argument was wasted on him. He was asked, "How will your skates slide on the greased rails, when, as will happen directly, they become covered with dust adhering to them?" "That, gentlemen," he replied with an air of triumph, as if he were destroying the effect of the question on the mind of a court, "is something for you to provide against."

The conversation then took this form: He was asked, "Did you ever hear of the mechanical device, termed the wheel and axle?"

"O, most certainly, gentlemen; you cannot teach me anything about that."

"You know, then, that one of its offices is to reduce the loss from friction; that it accomplishes this object by diminishing, very greatly, the amount of sliding motion of one surface upon another, transforming that which is so got rid of into rolling motion; and that the small surfaces that still slide on each other are certainly lubricated, and protected from dust."

"Gentlemen," he replied with energy, "I have absolute

confidence in the value of my invention. All that I require is capital to enable me to demonstrate it."

"You will need for that purpose," his interlocutors answered, "about twenty-five dollars. With this sum you will make a little model, on which the difference can be shown at once between the power required to move, say, five pounds, along a line of rails when set on skates, and when carried on wheels."

The suggestion was resented, as trifling with his invention.

This example illustrates the character of mind that truth cannot enter, a mind that is completely occupied already with its own prepossessions. Yet such a mind is not wholly self deceived. While loudly proclaiming the certainty of its belief, it is careful to avoid a fair test of it. Minds of this character prefer, generally, some department of thought, in which their dogmas cannot be brought to the test of an observation. This is the disposition that controversy developes, and perpetuates itself by developing it. It is the disposition which is in all respects the opposite of that which mechanical science demands, and which all the influences of this science combine to produce.

Let us now, by way of contrast, suppose a disposition of the latter kind, and approximations to which are by no means rare, in the case of a real inventor, who is possessed of that choice gift, a judicial spirit; a spirit humble, teachable and honest, both with itself and others. Such a man conceives of something new, and which appears to him to be practicable. In reflecting on his idea, he finds after a while that he has reached a point, from which he can make no further progress by thinking. His invention has been matured in his mind, so far as he can go.

He now proceeds to construct his machine, or apparatus, or whatever the device may be, according to the light he has. Then he puts it into operation, sits down before it like a little child, opens his mind wide to receive instruction, and lets the invention itself teach him, by its practical working.

His spirit being entirely receptive, he is sure to receive the revelation. This revelation may be, it often is, that

his scheme is radically defective, that his idea was a delusion, that there is nothing in it.

He recognizes the infallible character of the criterion to which he has appealed, and perceives the demonstration of the unwelcome truth in its full force. It costs him a pang and a tear, but, as he sees his dreams melt away, he feels that he has learned something, that he has been to the fountain of knowledge and has received instruction, and that he is capable of better things than he was capable of before.

Instead of total condemnation, the disclosure may be, that something he never thought of, just in the last place he would have expected, is wrong or is wanting. Sometimes defects will appear that puzzle him, and the nature of which can only be discovered by long study. Perhaps, again, the revelation may be, if the scheme is a radically new one it is pretty sure to be, that extensive changes of a radical nature must be made, before the invention can be fairly judged of. All real inventions are slowly reached through just such discouraging revelations.

A fact here confronts us, that is well suited to command our attention. In every attempt made by man to produce anything of a novel character, something is sure to be wrong. No finite intelligence ever, on the first attempt, produced or conceived of, even the simplest thing, in the form that was finally found to be correct and satisfactory. This is a fact of human experience. One who imagines that he would form an exception to this law, would be the last of all to approximate to initial excellence.

An individual may, from a knowledge of general principles, and from familiarity with like attempts, be able to say, in any particular case, what will *not* answer; to detect, perhaps at a glance, defects that are hidden from others; but whenever *he* attempts to produce anything new, even in the field with which he is most familiar, something will certainly escape him, until it is revealed in practical operation. The variety of possible conditions and combinations is so great, and the range of our thought is so closely limited to our previous experience, that successful inventors always come to be astonished at the crudity of their first attempts.

It should be observed, that the word "new" is rarely employed in an absolute sense. In the comparative use of this word, there are endless degrees of novelty. Generally, in mechanics the word "new" is employed to mean merely new arrangements, or the application to new uses, of devices which are familiar. In some of the more simple of these novel combinations of familiar devices, it occasionally happens that a person of experience in their use, by careful study, succeeds in his first attempt. But, on the other hand, for any finite mind to enter upon that which is new in mechanics, in anything like the absolute sense of that term, is like entering an unknown sea, whose extent and every indentation of whose shores must be learned by observation.

The fact is an obvious one to every candid mind, and is one which all experience impresses more deeply, that only an infinite intelligence can comprehend beforehand, and can embrace in its view, all the conditions and requirements that will manifest themselves in the operation of a new device. Man must grope his way through darkness into the light.

The following general conclusions seem to be warranted, as the clear teaching of mechanical science respecting physical truth:

First.—Although the mind may be wholly unconscious with whom it has communed, this truth is to be found by it only through a direct appeal to the infinite source of truth; and

Second.—Only the teachable spirit, completely emptied of self, can recognize the existence of the source of truth, or can receive the revelation of truth which is always ready to be imparted.

These conclusions are here limited to physical truth. As we advance in this discussion their universal nature will appear, even before we come to observe the unity of physical and spiritual truth.

THE UNITY OF THE MIND.

In reflecting on the general subject of these papers, I have found myself embarrassed by the term "faculty," and the meaning that is affixed to this term; comprehending, as it is made to do, certain functions and activities of the mind, to the exclusion of others.

Thus, according to the accepted systems of philosophy, we possess the faculty of the reason, the perceptive faculties, the faculty of the will, the faculties of memory and imagination, the æsthetic faculty, and the faculty by which we distinguish right from wrong. To these some theologians have added the faith faculty.

On the other hand, in all existing systems, the emotional nature is represented as being without faculties. Nothing is admitted to be a faculty, that does not come within the category of what are termed the intellecual powers. We can, therefore, have no faculties with which we rejoice or grieve, or love or hate. We do all these things, but we do them without the employment of any faculties.

After a while I began to inquire what the word "faculty" really means. It is a word in universal use, a component of accepted formulas of speech; and, until one has broken through the thick ice of conventionalism, it certainly appears as if this word "faculty" must represent some kind of a reality. It pretends to convey an idea of something definite and substantial. But the least scrutiny exhibits the fact that all these "faculties" are nothing but figments of the brain.

In our philosophies the mind has been divided and subdivided, and these divisions have been classified and arranged into systems; and such methods or analyses are taught by teachers who have themselves been taught them, just as if these divisions of the mind, instead of being wholly imaginary, were as real and substantial as are the physical divisions of the earth.

The result of the examination that I have been able to

give to this subject is the conviction that the mind or spirit is a unit, and that in all its operations it acts as one whole indivisible being; that therefore the divisions described by philosophers have no existence, and all these substantive terms are only conventional expressions, that represent no realities.

The spirit is a unit. What have been termed faculties, as well as the operations of what is distinguished as the emotional nature, are only the different modes of our spiritual activity; into each form of which activity, as this form is determined by the occasion, the spirit directs its whole power.

The spirit is a unit. It is the same conscious self that both thinks and feels, that performs every mental operation and is sensitive to every moral impulse.

It is the one self-conscious indivisible being, that successively observes and remembers, that reflects upon the images that it has formed in consciousness by observing, and which it retains or recalls there by remembering, that judges, that decides, that resolves, that impels to speech or bodily activity, that constructs imaginary forms, that grieves or rejoices, that loves or hates, that is true or deceitful.

It is the one conscious intellectual, moral and emotional unit, in its completeness, that exercises itself as such unit, in each and all of these different ways, as the occasion calls for such exercise, and in each one according to its development in power and in disposition.

As the sun light, though manifold in its composition, is a unit, and as all life which it calls into being would be different in some respect, if the constitution of the sunlight were in any particular different, so every act that we perform, every thought to which we give shape and every emotion that we feel would be in some respect a different act or thought or emotion, if our whole combined intellectual, moral and emotional nature were in any particular different from what it is. Every act and thought and feeling is the act or thought or feeling of our spiritual being as a whole.

No intelligible meaning can be affixed to the term "faculty," except "a mode of exercise," "a form of spiritual

activity." In the ordinary substantive sense of this term, if indeed any one can define this sense, there are no such things as faculties.

The incorrectness of saying that we possess faculties is abundantly exposed by the fact, that when we are once accustomed to admit this form of expression, we do not perceive the absurdity of proceeding further, and saying that we possess minds, or even that we possess souls. The fact is, we *are* minds, and what have been termed the faculties of our minds are in reality only *some* of the various forms or modes of our spiritual activity.

It is a curious and instructive study to trace the origin of this arbitrary division of the mind into these imaginary distinct and unrelated faculties. These divisions were obviously the product of a rude process of thought similar to that which evolved the system of polytheism.

In earlier ages men observed the various divisions of natural objects, but had no conception of the unity in which these divisions are combined. They created, therefore, in their imaginations a separate divinity over each one of them. Then, observing in the same isolated fashion their own different occupations and interests, they imagined other divinities, also, presiding over each one of these. The tendency of the heathen mind has always been to multiply these imaginary deities.

The conception of one God is the most sublime of all possible conceptions. Science has shown the unity of the creation, a unity comprehending the universe, and which is expressed by its name. It has thus demonstrated the truth of this conception of one Supreme Being.

We are taught that this great truth of the divine unity was imparted to mankind by direct revelation. The observation of the uniform tendency of the mind in the opposite direction, or to the multiplication of divinities, as illustrated in all pagan history, affords strong confirmation of this doctrine. If, however, any doubt remains that a direct revelation was necessary in order that the truth of one God should enter the human mind, that doubt must be removed when one considers the persistent tendency of our thought to division, as this is exhibited in modern mental philosophy.

Precisely as men reasoned, if indeed the term "reason" can be employed in such a connection, in creating their separate divinities, so they have reasoned in imagining separate mental faculties.

They observed the members of their bodies, and saw that each one of these members had a separate and distinct office to perform, and which it was expressly fitted for performing ; as, for example, the eyes for seeing, and the limbs for walking. From this observation they were led to conceive of their minds, as being also composed of members, each one of which was expressly adapted to the performance of separate and distinct functions. These several mental operations were arranged in classes or divisions, without much regard to the unity that comprehends them all, and a member or faculty of the mind was imagined, adapted to perform each one of these classes of operations. So these imaginary faculties received from the philosophers, just as the divinities did from the poets' pen, their "names and habitations."

The description and classification of these imaginary faculties, and the definition of the boundaries allotted to each one, or of its especial function, is called mental philosophy.

In this operation of cutting up the mind, a difficulty was encountered when the dissectors came to the acts of rejoicing and sorrowing, of loving and hating, and of speaking or acting truly or falsely. It was evident that these must be the acts of the spirit in its unity. No ingenuity could contrive separate members to which the performance of these acts should be committed.

The difficulty was met after the heroic or Alexandrine fashion. What were regarded as the moral and emotional parts of our nature were denied the possession of faculties. Moreover, being destitute of these appendages, it was obvious to the philosophic mind that this supposed separate department of our spiritual being was not entitled to scientific consideration, in any such sense as that in which this consideration was bestowed on the intellect, which was held to be blest with the exclusive possession of faculties.

Philosophers, essentially repeating one another continu-

ally, have been blind to the fact that, in assuming the reality of this artificial and wholly imaginary system, they have ignored the supreme element of spiritual existence, and the highest form of activity in their own nature, in a degree that is fatal to any conception of truth in its unity, or to the conception of the real nature of truth.

Now, it is submitted that it is high time that all this work of the imagination should follow the classical deities, which, in the conceptions of their adorers, were once so real that they could not be spoken against, but which have not now a worshipper; and that the recognition of the supreme truth of one God should be supplemented by the recognition of the truth of the unity of the human mind.

The importance of this latter truth, and the necessity for its recognition, if any progress is to be made in the apprehension of spiritual realities, will become abundantly evident as we advance in this discussion. Moreover, it will be seen that practical consequences of a most serious and injurious nature follow from this doctrine of divisions of the mind, a doctrine which has been universally accepted, as if these divisions really existed, instead of being imaginary parts of the spirit of man, which, in reality is indivisible. The artificial and mistaken habit of thought which has thus been engendered affects disastrously both our systems of education and our religious conceptions.

MECHANICAL SCIENCE AND THE REASON.

In a preceding paper reference has been made to a class of persons who, from whatever cause, are, in fact, not honest seekers after truth. The ascertainment of truth is not the real object of men who belong to the class referred to, however they may persuade others, and even themselves, to the contrary.

The real purpose of such persons is to strengthen themselves in a belief already formed. They are laboring to sustain their theory, to maintain their position, to carry their point. They always have a feeling of anxiety about the result of their inquiries, a feeling that is quite at variance with a judicial disposition, and which marks the advocate.

We come now to consider another class of thinkers, and a numerous class at the present day, who are more agreeable to contemplate. This class is made up of men who, for the most part, are sincere in their search after truth, but who make the mistake of supposing that truth is to be ascertained by the mere exercise of their reasoning powers.

This influential body of men, led by profound and acute minds, present a study of the greatest interest. Whatever may be the differences, and these are endless, in the particulars of their belief, they all agree in one thing, and may be grouped together as rationalists. All forms of rationalism unite in claiming supreme authority for "the unaided human reason." In this the rationalists repeat the philosophy of antiquity, and they likewise imitate that philosophy in employing "empiricism" as a term of reproach.

Rationalism delights in confusion of thought. It exists only by virtue of confusion of thought. When this confusion shall be reduced to order rationalism must cease. It disregards the broad and fundamental distinc-

tion between reasoning and observing. It claims for the reason every discovery in science and every invention in mechanics, when it is certain that all these are revelations to man, which are received by him either wholly, or at least primarily, through the methods of experiment and observation.

Thus, using words in a loose and incorrect manner, rationalism ascribes to the reason a vague and boundless authority. It worships this imaginary faculty, this creation of its own hands.

The influence that is exerted by rationalistic teaching at the present day is very great. It is felt in every department of thought. It affects largely the teaching heard from the pulpit. This influence is wholly pernicious. Under it the mind becomes lost in endless mazes of error. The more brilliant the will-o'the-wisp that allures into any of the vagaries of rationalism, the more hopeless the entanglement becomes. Confidence in the conclusions if the reason is a delusion that is all the more fascinating and dangerous, because it flatters the pride of intellect, a conceit that, like "the fatal gift of beauty," often turns the heads of its possessors to their ruin.

Mechanical science calls a halt to this vain wandering of thought. It shows, and insists upon, the distinction between reasoning and observing. It shows that wherever mental speculations can be brought to the test of experiment and observation, they are invariably discovered to be wrong. In mechanics it is found, universally, that every step taken by the mind in advance, on untrodden ground, however certain the processes of reasoning may seem to be, is always taken, in some degree at least, in a wrong direction, and needs to be corrected ; and that the mistake can be corrected in only one way, namely, by experiment and observation. Thus mechanical science directs thought into the paths of true philosophy. This philosophy, it will be attempted briefly to outline, so far as is required for the purposes of our argument.

The first step must be to rid the mind of that creation of our imagination, the reason. No progress can be made until this has been done. A glamour surround this "shape that shape has none," that seems to render cor-

rect reasoning extremely difficult. When, however, we are able to see clearly that the only reality that can be expressed by this term is the mental process, by which the spirit of man, in its unity, discusses the appearances which are given in consciouness, then the first position has been gained. It is important that we should see that "the reason" is, itself, one of those unwarranted conceptions that the spirit, in its form-constructing activity, is continually creating. When we are fairly rid of this conception, and are able instead of it to consider the act of reasoning, then it becomes evident that the subject matter of reasoning must first be given in consciousness, and the distinction between reasoning and observing becomes an obvious one.

The act of observing, including the verification of the reality and the truth of the image formed in consciousness, is an exceedingly complex act. It calls into exercise every form of our spiritual activity, and it manifests all the qualities that, in their aggregate, constitute character. It is not proposed to attempt an analysis of this act, but only to point out that the appeal for the exposure of the falsity, or the verification of the truth, of the mental conception, must always be made to a criterion existing wholly outside of the mind itself.

The science that deals at once with spiritual and with concrete realities, affords here the very help we need. It does this in two ways, first, by maintaining the important distinction between the acts of observing and of reasoning, and, second, by exhibiting the tendency of the mind to form erroneous conceptions, and its complete inability of itself to correct or even to detect its errors.

It is interesting to consider the light that is thrown by mathematics upon this distinction between observing and reasoning. The processess of mathematical reasoning are certain. They are of a nature that excludes doubt. But in the physical applications of mathematics, that is, in the application of mathematical reasoning to any purpose whatever, the correctness of the result depends entirely upon the correctness and the sufficiency of the data, and these data mathematics does not provide, nor does it primarily contribute in the least degree to their provision.

The fault is not an uncommon one among mathematicians of neglecting proper verification of their data, or proper assurance that all essential data have been given them. The mathematical mind, just in the degree that it is exclusively mathematical, seems inclined to be wrapped up in its processes, and to be satisfied with *their* certainty, so as to be incapable of appreciating the anxious observation that must be exercised in ascertaining the data on which its calculations are to be based. In this respect, a similarity appears between mathematicians and rationalists, that is precisely what one would expect.

I once witnessed an incident that illustrated the uncertainty which attends all physical applications of mathematics, in cases where the necessary data have not been well established. At a meeting of the American Association for the Advancement of Science, that was held in the city of Albany some twenty-five years ago, in the Physical Section, which was presided over by Professor Henry, a paper on a subject in mixed mathematics was presented by Professor Pierce, of Harvard. When the reading of the paper had been concluded, Professor Alexander, of Princeton, arose and requested that the discussion of it might be postponed till the next day, as he expected then to present a paper on the same subject, in which, by a different course of reasoning, he had arrived at precisely the opposite conclusion. Some different elements had entered into the problem, as it had been attacked by each of these eminent mathematicians.

The discovery of the planet Neptune is often cited as a prominent and striking instance of the discovery of a fact by the mere exercise of the reasoning powers, through a purely mathematical process. This discovery is referred to here on account of the important aid that it renders to our argument. No event has ever been more misapprehended, for there is none that places the distinction between observation and reasoning in a stronger light, or that exhibits in a more remarkable manner the dependence of reasoning upon previous observation for the correctness of its results.

The power of the analysis that could locate the unseen planet, and the strength with which this mighty weapon

was wielded by the young English and French mathematicians, whose names are forever associated with this discovery, command the admiration of men. The basis on which this analysis proceeded was, the accumulating irregularities in the orbit of the planet Uranus. This orbit had been computed, as it would be determined by the influence of all known attractions; but, to the surprise of astronomers, Uranus did not move in this orbit. The degree of its departure from it was ascertained by observation, and this obviously could not be learned in any other way. If these observations had not been exact, or if they had been insufficient, in either case the mathematicians would have been misled, the result reached by the mathematical process would have been wrong, the planet would have been looked for in the wrong place, and would not have been found.

But it is reserved to mechanical science to afford the most convincing demonstration both of the dependence of reasoning upon data otherwise ascertained, and of the tendency to error in all mental processes, which tendency can be shown and corrected only by observation and experiment.

We may first refer to the application of mathematical reasoning to mechanics. Engineers know very well that it will not do, in practice, to conform to any deductions of mathematics, unless these deductions have been founded on exhaustive experiments. All such deductions made in disregard of this requirement, and it may be added that the name of these is legion, are presumably worthless. Some factor is certain to be omitted; some requirement, often of great consequence, is sure to be under-estimated, or even to be entirely overlooked. The result of every experiment is always in some respect a surprise. Something is revealed that was not anticipated. The great structure of mechanical science has been reared by mathematical investigation, upon the foundation of experiment; and, to change the figure, experiment has been the plumb and the level and the square, the application of which to this structure has been necessary at every point in its rise.

The unvarying fact that appears in mechanics is one

that requires to be stated again with emphasis. Every step that is taken in advance upon untrodden ground is sure to be taken in some degree in a wrong direction; and the mind possesses within itself no power to correct the error, nor even to determine whether or not the step is an error.

Notions of a novel character, which, from all the thought that can be given to them, even by experienced persons, seem most certain to be correct, turn out in the large majority of cases to be delusions. The experience of inventors in every branch of mechanics, as well as that of explorers in those branches of physics that are not strictly mechanical, will confirm this statement. The most comprehensive knowledge fails when it finds itself confronted by a single unfamiliar feature. The tyro is always confident, but the utmost that the man of experience will permit himself to affirm respecting a new device or new operation, even in those rare cases in which he can detect nothing which is at variance with truth already established, is that it seems to be worth trying.

One of the greatest of living inventors once said to me: "There can't be any more mistakes, I have made them all." Professor Tyndall relates that, in entering upon his investigations respecting the power of the atmosphere to arrest radiant heat, he assumed that the aqueous vapor contained in the atmosphere, being so minute a quantity, rarely exceeding one two-hundredth part of the volume of the air, might be disregarded. He was perplexed by the varying character of the results obtained, until he began to suspect that the varying degrees of humidity of the atmosphere might have something to do with these results. The final outcome of his exhaustive researches, as is well known, was the discovery of the important fact, that dry air has no power at all to arrest radiant heat, and that the aqueous vapor contained in the atmosphere, which for a long time he could not see that he should pay any attention to, affords the only protection to the earth, to prevent the immediate loss, by radiation into space, of the heat received by it from the sun.

Such candor as is exhibited in these confessions marks the true seër into nature. Through such minds only can phy-

sical truth be revealed to men. And it is only by effort on the part of such men, sincere, patient and persevering in a degree beyond ordinary comprehension, that the clouds and darkness which are round about every form of physical truth can be penetrated.

Poets are not by any means authorities, but in the line

"What can we reason but from what we know?"

the poet came very near to expressing the truth. The important addition, "or what we suppose that we know," would most likely have spoiled the versification, but would have made the question complete.

Thus mechanical science exposes the true reality of what is so proudly termed "the unaided human reason." And it does this in a manner that enables the baseless character of its pretentions to be seen and understood by all men.

It is certain that in mechanics, all attempts to ascertain truth by mere reasoning infallibly lead men astray. Active minds create legions of phantoms, all of which need, not to be discussed and argued about, but to be mercilessly exposed and destroyed. In mechanics we see clearly enough, that the employment of "the unaided human reason" is merely reasoning, or pretending to do so, without any properly established data, which here at least would obviously be the work of fools.

In mechanics we are confronted by two facts, which are as familiar as any facts of human experience can be. The first of these is, that, in the search after physical truth, the mind is, to the last degree, fallible, and liable to error. Where, out of all possible images that we can form in consciousness, there can be only one that corresponds with the reality, we are equally liable, instead of this, to form any one of the endless number of images that would represent nothing, and to accept this phantom of our brain as true. We have within ourselves no power to distinguish the true from the false. In advancing even one step beyond what is already established and familiar, we find ourselves in absolute need of a guide, who shall arrest our tendency to error, and shall set our feet in the right path on solid ground.

The second fact is that this infallible guide has appeared, surrounding man on every side, precisely adapted to this service, demanding his recognition, and his absolute submission to its control and guidance; and that it is by the aid of this guide that all progress in physical knowledge has been made.

It is the familiar teaching of mechanical science, respecting the means by which we have arrived at our present knowledge of physical truth, and by which all further knowledge of this nature is to be got, that this knowledge is imparted to us, and verified to us, wholly from without, beyond and above ourselves.

Now, this is a fact of supreme consequence, not only in itself, but still more on account of the deductions which appear naturally, and indeed necessarily, to be drawn from it. For there seems to be no way of escape from the conclusion, that this truth, which is so certain with respect to the facts of mechanical science, and, it should be added, of all science as well, must in reality be a universal truth, of which these practical illustrations or applications are, to our present sight, merely the most obvious and unmistakable expressions.

The following propositions seem to be self-evident:

First. If the unaided human mind cannot be relied upon for the ascertainment of any physical truth, this is a direct intimation that we are not to rely upon it for the ascertainment of any other form of truth. If, as is obviously the case, our mental powers are not given to us to be employed as the means for arriving, by any mere unguided exercise of them, at the knowledge of physical truth, we have no right to rely upon their unaided power or activity as the means of arriving at higher forms of truth. If at every step to physical knowledge we need an infallible guide, it is a reasonable presumption that we require such a guide everywhere.

Second. If such a guide is found to have been provided here, it would be unreasonable to suppose that mankind have been left helpless in any other respect. On the con-

trary, the presumption is exceedingly strong, that if, in his search after physical truth, man finds at his hand the very aid he needs, without which he must have remained in helpless ignorance, in a state in which every creation of his imagination would appear to him as a reality, but by the employment of which he may hope to reach the heights of physical knowledge, so he must be able, if he will, to find aid equally available and equally efficient, as well as equally indispensable, in his search after spiritual truth.

And finally. If this guide to physical truth can be of no service to man, except as he seeks for it, voluntarily employs it, recognizes its infallible nature, holds his constructive and his reasoning powers entirely subordinate to it, yea, humbles and prostrates himself before it, it is a reasonable conclusion that he must deal in precisely the same manner with the guide that shall lead him to the knowledge of any truth whatever.

Such a unity pervades all truth, physical and spiritual, and this unity is so obvious to us, that the force of this argument from analogy cannot be either disregarded or resisted. The criterion of all truth, spiritual as well as physical, to which the appeal must always be made, is to be found only at its source, and the universal guide to it is

REVELATION.

In the preceding paper I have endeavored to point out the analogies that are afforded by mechanical science, and which seem to lead to the conclusion that *all* truth must be communicated to the human mind from without, that is, by revelation. In this and subsequent papers I shall present some considerations which tend directly to confirm this conclusion.

If it be the fact that we cannot arrive at the knowledge of any truth, except as this knowledge is imparted to us from a source external to our own minds, then, clearly, it is of the first importance that this fact should be universally recognized. However inclined the reader may now be to question this proposition, in the general form in which it is stated, I hope, if he will accompany me in my attempt to present the reasons on which the proposition is rested, he will in the end be prepared to give his assent to it, to yield to the evidences of its truth.

Our minds must first be disabused of an unfavorable prepossession. The term "revelation" has been used in a restricted sense. It has been customary to employ this term only to express the verbal mode in which the highest of all forms of truth has been communicated to man; and which particular form of truth it is obvious could not have been imparted to him in any other way.

It is claimed that this limitation is unwarranted, and also that it is unfortunate, in that it has served to hide the essential unity of all truth, by assuming a radical distinction between the modes in which the knowledge of its different forms or manifestations is conveyed to us; a distinction that in reality has no existence. All forms of truth proceed from one source, and are intimately related to each other, and are associated with each other in their relations to man. The essential unity between physical and spiritual truth will form the subject of a separate paper.

At present we will only observe, that this unity enables the latter class of truths to be presented under the forms of the former class; that both alike involve deep mysteries; that truths of either class are capable of being apprehended only by the humble and teachable spirit which has been prepared for their reception; and that, within the limited extent to which the knowledge of either physical or spiritual truths is possible for us, there are degrees in the apprehension of either, which are proportionate to the fitness of the mind to receive the truth, and to the earnestness of the search for it. These close analogies or likenesses point clearly to a common source, from which the knowledge of both these forms of truth is imparted to us. If this indication be correct, then the term "revelation" ought to be employed in a general, or rather in a universal, sense.

In point of fact, all truths are equally revealed to men, only the mode of revelation differs, as the nature of each truth requires. We shall find that different classes of truths are revealed to us in different ways, as is made necessary by their varied nature. Each one of the several modes of revelation will be seen to be the only way in which, as we are constituted, the particular class of truths which is revealed to us in that way could be made known to us.

Attention is first invited to some general considerations which serve to indicate very clearly that all truths must be imparted to the human mind from a source external to itself.

With respect to mechanical science, the truth of this proposition has been abundantly shown. But a general survey of the history of human thought will prepare the mind to receive evidence of its universal character. It will be observed that, just as the unguided imagination becomes filled with false mechanical conceptions, in precisely the same manner out of the unguided activity of the mind there have proceeded all false religions, all false morality, and all false philosophy, of whatever form. From within the human spirit all perversions of both physical and spiritual truth have sprung. In every field of thought alike, men have constructed in consciousness

images which represented no realities, and have treated these vain fancies as if they were true.

Thus all experience appears to confirm the deductions of analogy. The liability to error, the need of a guide, which is so manifest in exploring the regions of physical truth seems to be equally apparent in every other field of thought. In all alike, whenever the mind acts independently of direction from the source of truth, it seems equally liable to fall into error. It would appear as if this tendency to error was not by any means confined to mechanical truth, but was rather a universal one, and that its invariable presence in the former relation, that experience renders so obvious, merely serves to open our eyes to its universal existence. Indeed, in the light that is shed on this subject from all these sources, we seem warranted in the *a priori* conclusion, that whatever has its origin in the human mind, and receives its development from the unguided operation of that mind alone, must of necessity be false. It would seem that all truth must come to us from the infinite; that an intelligence that is less than infinite can come to the knowledge of any truth only as it is taught.

If this be the case, then we are shut up to revelation. It must be by revelation alone that we can receive any certain knowledge. The source and the test of *all* truth must be wholly from above ourselves. We must submit to receive everything from the almighty hand.

I have used the expression "shut up to revelation." This is liable to convey a false impression. In reality, our minds must be opened to revelation. We cannot conceive of its abundance or of its variety. Spiritual as well as physical revelation fills the earth and the heavens. It is infinite. The fullness of our own being is limited only by the wideness with which that being is voluntarily opened to receive the universal revelation of all truth.

The question now presents itself: In what manner is this revelation made to us? The answer to this question is given in the nature of things. To our spiritual being as a unit, all appearing in the same consciousness, and in a degree that is limited only by our capacity to receive each one, every revelation of physical and of spiritual truth is

made through appropriate senses, with all which we have been endowed for the obvious purpose of receiving these revelations. This truth will, I think, be rendered obvious, if, commencing at the lowest form of revelation, we shall examine its various modes somewhat in detail. Such an examination will be attempted in succeeding papers.

THE REVELATION OF OBJECTS OF SENSE.

We begin our review with the external or sensible creation. This is certainly revealed to us. We cannot form in our minds a correct preconception of anything. If in any case we permit ourselves to form a preconception, this vanishes in the presence of the reality. The single obvious duty of every original inquirer is, to form a correct image in the mind by observation of the reality, and in no other way. We are endowed with a variety of physical senses, which are adapted for the observation of every quality of external objects, and which will convey to the mind true, and so far as they go complete, ideas of them. We thus obtain all the knowledge that we need to have, and all that we were evidently intended to have, concerning these objects.

We should observe here the variety of our senses. One sense alone may be deceived, indeed it often is so. But others are always at hand to detect the imposition. I once visited Eton Hall, the seat of the Marquis of Westminster. On being admitted to the grand entrance hall, the appearance of magnificence was very impressive. But I rapped on one of the supposed marble columns, and it was wood. The artist had done his imitative work wonderfully well, but it could not deceive the senses of touch or of hearing.

Universally, we find ourselves provided, in our various senses, with the means for verifying the reality of the objects themselves, as distinguished from the images of them that are formed in our minds, and also for verifying the correctness of these images, as the counterparts of the objects, which are presented through our senses for our mental apprehension. The completeness of the adaptation of our senses to both these functions, and the manner in which one sense supplements another, and all combine to give to the mind full assurance on both these points, are calculated to fill us with admiration and wonder.

Thus we find the beginning of human knowledge to be received into the mind by revelation, which is made in the mode and through the senses that are appropriate to the character of this knowledge. We need not here enter further into the philosophy of perception. It is necessary only to emphasize the fact that the single obvious duty of man in this relation is to observe. This, clearly, is the only function of the mind that it is now called upon to exercise. The objects of sense are not created by the mind. Their nature and condition are not in any way affected by its action. They are merely shown to it, and perceived by it. Man becomes a conscious, voluntary and active agent in receiving knowledge of this nature merely by observing.

But a mind is conceivable that refuses to receive knowledge in this way—that declines to submit to any such test of the correctness of its preconceptions—that insists that all these appearances are contrary to reason. Instances of such refusal are common enough where the facts have been observed by others. An example of this was furnished a few years ago by some German geographers, who had constructed a map of the interior of Africa as they concluded it necessarily must be, and who declared the reports of certain discoveries, when those were first announced, to be untrue, because the lakes and rivers discovered had not been so laid down on their map.

But we are supposing the case of a man who rejects, as unreasonable, facts that are being continually verified by the general observation of mankind. Common sense, however, recognizes the conclusiveness of the tests employed, and the fitness of the physical senses for this work of observation and verification.

The argument that I wish to urge is made very strong by the fact that there is no such person. No sane man ever thought of anything so obviously absurd, as in this field to set the conclusions of any process of reasoning before the facts that are established by observation.

But such a misdirection of our mental activities would be no more ridiculous than are those misapplications of them that we are accustomed to see in the opposite direction. We behold continual attempts made to establish

imagined spiritual realities or truths by processes of reasoning, when it is evident that reasoning is not the mode of spiritual revelation any more than it is the mode of physical revelation.

The present consideration of the subject of perception will be concluded with two observations:

First. Perception through our senses is obviously the only way in which external objects could be revealed to us. Language would convey no idea of them. Our senses are expressly adapted to receive or to form the images of these forms of truth, and to present these images and verify them in our consciousness.

Second. We shall find this to be the universal law. Every fact and truth, physical and spiritual, from the lowest to the highest, is, in like manner, revealed to man, in the only possible way, through senses which are expressly adapted to receive it, and to present it and verify it in consciousness.

We come now to consider the revelation of the facts of natural science. Here an interesting distinction presents itself. The ordinary objects of sense, when these are first beheld by any individual who is capable of reflection, are viewed with the consciousness that, while new to him, they are familiar objects to others, and have been so to all generations of men. But in the case of a fact in science there is always a discoverer, to whom the fact is first disclosed, and by whom it is viewed, as Galileo beheld the planet Venus crescent like the moon, or the satellites revolving about Jupiter, or, as recently, the satellites of Mars were seen by Hall, with the consciousness that he is the first of mortals to behold it, and that through him the knowledge of it is to be conveyed to the minds of his race.

In all cases, however, there is the certainty that the fact itself is not new. There is an intelligence to whom it has always been familiar, while it is not unreasonable to suppose that there may also be an infinity of inferior intelligences, by whom it was known before. In most cases,

as in that of the pressure of the atmosphere, we find that the fact, while it was yet all unknown to man, had its myriad uses. When once the fact has been disclosed to us, these uses are found to come within our comprehension, and to be in immediate connection with our own daily life, just as multitudes of facts are, of the nature of which we still remain in ignorance. We then discover that all nature had been adapted to this fact, that in the infinite complications as it appears to us, but what in reality is the harmonious interrelation of all created things, this fact was essential to the performance of innumerable functions by other agencies ; that in the beginning it had formed a necessary feature in the plan of the creation.

With respect to discoveries in natural science this fact appears. These discoveries are all made by the activity of the mind in observing—the same mode in which the mind exercises itself in forming images of any objects in nature. The difference lies wholly in the closeness of the observation, in the degree of attention that is given, and in the discrimination that is made. Between thes different degrees of spiritual application no line of separation can be drawn. We pass by insensible steps from one extreme of care and power in observation to the other.

From the first discovery of its own hands by a little child up through familiarity with all things as they are presented to us, still up, till we reach what are known as elemental forms of matter, where now our progress in this direction is arrested, still up, until we see the trained and penetrating intelligence able, through the revelations of the spectroscope, to affirm the constitution of suns and of nebulæ, and still up, through all physical discoveries that ever shall be, we see all to be made by directing the spiritual being into the same form of activity, with reference to different objects, by the aid of different helps, and with different degrees of concentration.

In all these cases alike, we deal with those manifestations of force which are familiary known as matter, and for the apprehension of which by us they and our senses are mutually adapted. And in all alike, the mind, in order to be fit for the reception of the true image, must be

absolutely free from preconceptions, so as to be able, with just discrimination, to estimate all appearances at their true value.

Moreover, every mind must be at liberty to point out the oversights or the misconceptions of any other mind, so that, through many independent observers, every form of personal error may be detected and corrected. In this way the true idea, corresponding to the reality, is finally determined.

It will be observed that discoveries in science are made by the faithful employment of all the powers and means of observation that are either directly given to man, or that he is endowed with the ability to produce. This is the way in which all the facts in physical science are revealed to him, and, as was observed with respect to the ordinary objects of perception, it is obviously, as we are constituted, the only way in which these facts could be revealed. From the complete adaptation of our physical senses to this work of perception and verification we have the same right to conclude that they were expressly designed by their Maker for this obvious and necessary use, that we have to conclude that the instruments that we employ to aid us in these researches were expressly designed for this purpose by *their* makers.

It is a fact well worthy of observation, that it has never occurred to any one to say : If we possessed an additional sense, we would then be able to apply an additional test of the reality of external objects, or of the correctness of the images of these objects that we form in our minds? This has never occurred to any one, and it never can occur to any one, because we do not feel any such want. We perceive our equipment for both these purposes to be complete. We cannot conceive of any use for another sense, nor of another sense to be used. We cannot imagine a test, to these ends, additional to those which we are now able to apply. On both these points the employment of the senses that we have brings entire conviction and satisfaction to our minds.

We note here already the appearance of the universal law of hungering and thirsting. The pearls of science are not cast before swine. Physical truth can be imparted

only to those minds which have been prepared to receive it, which are devoted to the search after it, and which prize it above rubies. Minds that are in any degree indifferent to it must, just in that degree, remain dead to its existence. And, on the other hand, the completeness of the preparation, and the earnestness of the search, measure the degree in which this form of truth, like every other, is, or properly speaking can be, imparted to man.

In concluding these remarks upon the revelation of the physical creation, I desire to call special attention to the fact, that this revelation is always inclusive of the *verification* both of the reality of objects, and of the truth of the images of them that we see in consciousness. No question can arise here about the criterion of truth. The evidence is conclusive to the mind that is prepared to receive the truth at all. The inquirer has been to the highest source of knowledge that he can conceive of, in fact, he has been to a higher source than he can conceive, and he is satisfied. This we shall find to be the case universally. Every form of revelation is of such a nature as to be conclusive of its own truth, to minds which are prepared for its reception.

COÖPERATION.

A difficulty has doubtless already occurred to the reader, in the way of admitting the truth that we receive all our knowledge by revelation. This apparent difficulty lies in the fact, that knowledge is so obviously acquired by our own exertion. In the mere work of perception, already first considered, we are required to employ our senses, and to bring our spiritual being into a state of activity ; and in the higher departments of knowledge the mental effort by which this knowledge is acquired is still more serious, being in most cases the utmost of which we are capable. How, then, can knowledge be said to be revealed to us? Before proceeding further, it is necessary that this question should be answered.

The same difficulty comes in the way of our understanding the truth, that all our possessions are given to us, when, apparently, we get them ourselves. These possessions are the direct fruit of our own exertions, unless we have obtained those which are the fruit of the exertions of somebody else. In the same manner, all achievement is the result of properly directed and adequate effort, and it is not to be reached or accomplished in any other way than by such effort.

The truth about all this matter was fitly illustrated by the Christ, in the declaration that our Heavenly Father feeds the fowls of the air, when we have the apparent evidence of our senses that they feed themselves. When, however, we consider the matter, we observe that the series of acts that are necessary to sustain the existence of the fowls of the air is long and interrelated far beyond our power to trace. Of all these acts, the conscious and voluntary performance of only one is committed to the fowls themselves. They have only to select and take the food and drink that they find provided for them, and adapted to their sustenance. We observe further, that this single intermediate act is the only act that the fowls have the ability to perform. The power is given to them to do

that which is required of them, and which is committed to them to be done, and no more.

This is precisely the case with man. All difficulty disappears from this subject, when we consider, how many things are necessary to be done, in order that any revelation shall be received, or any result be accomplished, by man; and, out of this inconceivable number and variety of acts, how few have been committed to man himself. Almost everything is done for him. It is especially noteworthy that, as in the case of the fowls, so also in that of man, the little that is left for him to do is all that he can do. In its nature and its extent it is precisely adapted to his powers. It fully employs them. He is called upon to exert himself to the full extent of his ability. There is nothing, above that which man enjoys in common with inanimate nature, that he can receive without his own voluntary coöperative effort. From the supply of his lowest bodily wants, up to the satisfying of the highest longings of his spiritual being, his own active coöperation is the condition essential to every gift. We are able to perceive that this must be the case, in the very nature of things. The desire and the receptive power or condition must exist on the part of man. There obviously cannot be such a thing as the passive reception by man of any good, above that which, as already stated, he shares in common with inanimate nature.

We shall, in a later paper, have occasion to observe the fact that all the apparently independent agencies in nature are working together in harmony, coöperating with each other in ceaseless activity and to the full extent of their efficiency, for a single purpose, and that this purpose is the well-being and the happiness of man. We have now presented to us the further fact, that man, on his part, must join in this harmonious activity; that in order to become the recipient of any good whatever, from the lowest up to the highest conceivable, he must perform his appointed part. All agencies of which we have any knowledge are working for him, and we may naturally suppose that this beneficent activity extends also to agencies which it is beyond our power to discern; but all

must be to no purpose without the voluntary coöperation of man himself.

This law of coöperation is a most important one. A clear apprehension of its universal and necessary nature will aid us to the understanding of much that, for the want of such apprehension is often obscured. I shall, in this place, limit myself to a single illustration of this law, drawn from the primary labor of man. While thus observed only in its first and most simple application, its universal nature will be obvious. Then, when we resume the line of thought, now interrupted, we shall see the fact continually exhibited, that man's voluntary coöperative activity is the essential condition of the communication to him, or reception by him, of any gift, or any revelation, and may properly be considered as the mode in which these are imparted to him.

It is assumed as obvious that there must be an infinite giver, from whom we receive everything, including our existence. Beyond this gift of existence, there are only four things that we receive without our own coöperation, which, in a sense more or less absolute, may be termed voluntary. These are light, warmth, air and water.

Light fills the universe, and enters our open organs of sight. We may say that no act on our part, either voluntary or involuntary, is required in order that light shall enter these organs, and there form the images of external objects. Indeed, we must close our eyes in order to keep the light and the images out. So also from the same source, the sun, we receive warmth without any act on our part.

After these first gifts of light and warmth, it is interesting to observe the gradual manner in which our acts, upon which the reception of all other gifts depends, assume a voluntary character. At first the act is compelled by a sensation of want. It becomes truly voluntary only when choice has become free.

With respect to air, we have our being at the bottom of our atmospheric ocean, in which both the earth and all things and beings upon it are immersed, and out of which no animal or vegetable could exist. To receive this into our bodies, there to perform its amazing functions, we have

only to breathe. The act of breathing can hardly be called voluntary in any sense. The necessity is urgent, the supply is instant, and the act is performed with equal regularity in our conscious and our unconscious states.

Water, the next universal necessity, universally provided, we must drink. This is only a semi-voluntary act. It is performed under the pressure of an impulse, which, if not sooner yielded to, grows to be irresistible.

It is to be observed that we share these four gifts with all organic being, vegetable as well as animal. The existence of all alike is dependent upon them ; and in each one, and in the relations that each one sustains to all being, there are involved infinite wonders, to which the mind that is in the least degree thoughtful cannot, even by constant familiarity, be rendered insensible.

But we now pass beyond these. The vegetable creation has only to expose itself to the warmth and the light of the sun, to breathe and to drink. Animals must also eat. But for every creature except man its food also is provided, to be eaten in the state in which it finds it. Man only feels the need, and possesses the intelligence to till the ground and to make a fire. There are acts, additional to the single one required of the animal, for which man's intelligence was obviously given to him, and which he is left to perform. In the nature of things, a command is laid upon him to perform these acts, and this command he must obey.

Here, in the work of supplying his lowest physical wants, man's voluntary coöperative agency begins, never to cease. And even here we cannot fail to be struck with the relative insignificance of the part that is committed to man, essential though that part is. The earth to be tilled and the grain to be sown are provided for him. With these provisions he certainly had nothing to do. And now in faith and trust, not in the sunshine nor the rain, but, whether consciously or unconsciously it matters not, in reality, faith and trust in the unseen goodness behind the sunshine and the rain, and in the assurance of that power, whether heard or felt it matters not, that in the sweat of his face he shall eat his bread, he tills the ground and buries the seed out of his sight. In this simple act his ap-

pointed work is done. His part is performed. Now he has only to wait and wonder, while the sun shines and the rains descend, and the earth yields her increase. The seed springs and grows, he knows not how, and multiplies and ripens for the harvest.

It will not be necessary to pursue this subject further as a separate topic. The analogy which the mind naturally draws from this single illustration renders it sufficiently obvious, that our coöperation must be a universal requirement. The correctness of this conclusion all observation of human affairs confirms. We are prepared to recognize all human activity as the different modes of man's coöperative work. We repeat that there cannot be such a thing as the passive reception by us of any good above that which we enjoy in common with all animate and inanimate nature. The receptive state of man is a state of activity. Accordingly, throughout the diverse modes of revelation, varying as these do with the varied nature of the truths revealed, we shall find running, precisely as analogy would lead us to expect, the unity of man's co-operation.

THE REVELATION OF MECHANICAL TRUTH.

The subject of revelation will now be resumed, by contemplating briefly the revelation of mechanical truth. I do not propose to view mechanical truth here in its largest aspect; but merely to present some considerations suggested by the practical applications of this form of truth that are made by man.

We mark at this point the first important transition. In a preceding paper we had our attention occupied by the revelation of the forms of matter, or the sensible manifestations of force. Now, we are brought into immediate contact with the unseen. From what we term things, which, indeed, are only embodied thought, but which we are not often so regarded by us, because our attention is commonly arrested on the object, we pass to the direct contemplation of thought itself, and of those embodiments of it that have been committed to us.

In mechanical science, we find ourselves to have been placed between two creations, the seen and the unseen, as the agents for the embodiment of thought. Beyond that provision for our existence that we share with all the animal creation, we discover a boundless preparation to have been made for our welfare and happiness, the employment or the utilization of which has been committed to our own hands. The transition that we make here is not in reality so great as at first it seems to be. It is only from those thoughts which have completely embodied for us to those which, in a great multitude of their applications, have been left to be embodied by us.

For the purpose of this embodiment, these thoughts must be communicated to us. The common idea is that mechanical discoveries and inventions are made by men, and there we are accustomed to stop. But the properly developed mind cannot rest upon this idea. We have already dwelt upon the character of mind by which alone mechanical truth can be originally apprehended, and upon

the process through which such minds must pass, in order to arrive at the completed, or, as we say, the matured, thought of any invention or discovery. In a mind that is prepared to receive it a mechanical truth is disclosed gradually. Seen dimly at first, through close and often protracted application, and by submission to constant practical correction, the thought grows in distinctness, until at last it appears clear and self-luminous. And the proposition now is, that these truths, in all their completeness, are imparted to the mind by direct revelation, and that this laborious search is our necessary coöperative act, or is the mode in which these revelations are made to us.

When we reflect on this subject, one confirmation of this truth presents itself after another. We cannot conceive of thought except as existing in a mind. Indeed, we know nothing of thought except as a function of mind. We note, concerning the thought of any mechanical construction, as was observed concerning the facts of natural science, and the thoughts that are embodied in them, that the thought itself is not new. It is certain that there must be a supreme intelligence to whom it has always been known, a mind in which it has always existed, and as with physical truth, so here also, we may rationally suppose inferior intelligences to exist, in infinite number, by whom it was known before. In fact we cannot draw the line between physical and mechanical truth. Those are intimately associated with each other. We pass from one to the other by insensible steps. We see physical truth everywhere underlying mechanical truth. Moreover, we find throughout nature, especially in animal structures, embodiments of mechanical thought, which we recognize to be essentially the same as our own. Physical and mechanical truths cannot be essentially distinguished from each other. Their common origin is apparent. Whether, therefore, mechanical thoughts are completed in their embodiment by the Creator, or are in any part committed for this purpose to man, the truth of their eternal existence in the Infinite Mind, in all their completeness, however great may be the mystery that it involves,

is one that we find ourselves compelled to assent to, as much as to the eternity of physical thought.

Of the latter class of thoughts, Columbus was penetrated with one, namely, the thought that the earth is round. But clearly this thought had existed in the Infinite Mind since the earth assumed its form. Of the former class, let us consider some of the grander thoughts to which mechanical science has given embodiment, and which have thus become important agencies in the civilization of our race. These are thoughts of the varied applications of steam and electricity, which, in annihilating space and time in so large a degree, point unmistakably to a state of being in which our existence shall be wholly independent of these conditions.

It is not possible that any of these thoughts can be new, in the absolute sense of that term; for they constitute agencies of an essential character in the work of human development, and they must, therefore, have held a corresponding place in the scheme of that development. Neither is it conceivable that those thoughts should have been originated by man independently without having been imparted to him directly from the divine intelligence. The mode in which these thoughts are reached by him forbids such a conception.

The divine ordering of human affairs involves, of necessity, the communication of mechanical truths to man, as he becomes prepared for their reception. Rightly viewed, then, the idea of the direct revelation of these truths is seen to be not only the natural, but the necessary idea. No other case is conceivable, unless belief in the infinite mind be rejected altogether.

But if the foreordering and the communication to man of the most general mechanical thoughts be admitted, then this admission must extend to the most minute as well. There is no place where a line of separation can be drawn. Every part of any mechanical structure, however inconsiderable it may be, has its own especial function, that must be performed, and which it only can perform. It constitutes an essential feature of the complete conception. In the Eternal Mind thought is always complete. The minuteness of its detail is infinite. This is illustrated

everywhere in nature. So, when fully revealed to man, mechanical thought must be revealed in all its completeness.

This subject may be considered also from another point of view, and such consideration, it seems to me, can hardly fail to fix more firmly in the mind the conviction of the direct revelation of mechanical truth.

All forms of matter have evidently been prepared with reference to such revelation. Matter exists for the embodiment of thought. This is its great use. For many of its forms it is the only apparent use. The completeness of the adaptation of matter to this use is the subject of ever growing wonder. Matter has waited through inconceivable duration for these uses to appear. During this period it has passed through successive changes, and its various forms have entered into multiplied combinations, the uniform result of which has been to adapt it for varied uses, to which in many cases it was not adapted in its original condition. We naturally conclude, therefore, that adaptation to these uses was the purpose of these changes.

The absolute dependence of man upon matter for the embodiment or realization of his mechanical conceptions, and the complete fitness of matter for this purpose, constitute one of those amazing correspondencies with which nature is everywhere filled. The fundamental thought which, precedent to any activity, is always formed in the mind is a purpose, a thought of something to be done, of some end to be accomplished. The thoughts which succeed to this primary thought or purpose relate entirely to matter. They group themselves under two heads. The first is, the selection of the material suitable for the purpose. The second is, the mode of the application of this material to the purpose. The relation between thought and matter is, therefore, obvious. Matter exists for the embodiment of thought. Each is necessary to the other. Each is complementary to the other. The two are coördinate parts of one whole.

We cannot, then, stop short of the evident truth, that thought and matter are from the same source; that, as man cannot create matter, so neither can he originate

thought ; that, as the forms of matter are shown to man through his physical organs of perception, so also every true mechanical thought is revealed immediately to his mind ; and that, with reference to his work universally, he receives the command that Moses received, and which, from the very constitution of his being he must obey, "See that thou make all things according to the pattern shewed to thee in the mount."

We must not overlook the three-fold unity, which is apparent through their mutual adaptations, of thought, matter, and man. In the great scheme, the part assigned to man is the material embodiment of thought. The purpose that man conceives to-day is new to him, but it has existed, and matter has been prepared for its realization, from the beginning. It is now shown to him, and so he shares the thought, and becomes, through his free but harmonious activity, the agent to execute the will, and accomplish the purpose, of the infinite mind.

The impressive truth now appears, that these purposes are all purposes of good to man himself. There can be no escape from this obvious fact. Man is employed as the active agent in promoting his own happiness, in effecting his own civilization. This is the beneficent end, to the accomplishment of which matter, in its innumerable forms, is adapted, and for which all thoughts which relate to matter and its uses, and to which our view is at present limited, have been, and are continually being, imparted to man.

We see clearly enough that mechanical thoughts and uses for matter are fundamental requisites to the civilization of our race. Civilization appears only as these thoughts are disclosed to man. To the Indian, few and simple were the thoughts revealed, and so for him the forests decayed unused, and the marble and the ore lay unsunned. The revelation of mechanical thought has been made to man very gradually, one thought at a time, and in the order in which he has become prepared to receive it. Sometimes these revelations have been separated by long intervals, and at other times they have come crowded thick together. They have appeared in grander and grander procession since free thought began, in the pure

worship of Him "in whom are hid all the treasures of wisdom and knowledge."

The question presents itself respecting the multitude of erroneous mechanical ideas, mistaken notions, false conceptions, which first present themselves in the mind, whence do all these come? The only answer to this question is, that we do not know. We *do* know the fact, although we are ignorant why it is so, that everything requires its opposite. As there cannot be height without depth, or the right hand direction without the left, so there can be no truth without corresponding error. Moreover, while truth is single, error is legion. Here we encounter this law of opposites, and within ourselves we find not only an inability to chose correctly, to distinguish between the true and the false, but, moreover, we find that almost always some form of error is the first to appear, and we feel the inclination to accept and follow it as the truth. But we find also that from without, and involved in the very nature and method of the revelation, a test appears, that we at once recognize to be infallible, by which we shall know the true thought that is eternal, that alone inhabits the Infinite Mind, that forms a part of the universal harmony, and shall be able to distinguish this from every form of error. Then we find that no place remains for the latter, but as the truth grows brighter in the mind error vanishes away.

The mode in which mechanical truth is revealed to man suggests the reflection that inventions form no exception to the rule, that mankind must receive all their blessings through trial and suffering. Here, as everywhere else, this appears to be the appointed way. How wonderful is our mechanical inheritance! Few persons ever attempt, what is far beyond the power of any, to imagine its extent. Every real invention has been produced for the benefit of the human race forever. Many of these, indeed, pass into oblivion, but not until they have served as steps to something higher. What a history of endurance and weariness do inventions represent! the forgotten ones, the real germs, out of which the trees, perhaps long after, grew, often costing most of all.

The remarks presented in this paper are intended to ap-

ply especially to mechanical inventions. Respecting mechanical laws, or the uniform mode in which forces act, or in which matter behaves under the action of force, as well as respecting the properties of matter which adapt it for mechanical uses, it does not seem necessary to make these the subject of separate discussion. The train of thought already followed applies to them directly. It is evident that if anything of a physical nature is communicated to man by revelation, these must be.

THE REVELATION OF ABSTRACT TRUTH.

Leaving, now, this mixed subject of thought and matter in their relations to each other, we advance to the revelation of abstract truth, of ideal quantities, magnitudes and numbers, and the relation of these to each other, which constitute the science of pure mathematics.

One may say: "Surely these thoughts cannot be said to be revealed to us, for they are arrived at as the result of mental processes, that are performed within our consciousness, and they cannot be reached by us in any other way." There are, however, two things that place this subject before us in a different light. The first is, that these thoughts did not originate in any finite intelligence, and do not depend for their existence on any finite apprehension of them. They existed before they were conceived of by any man, and if there be an Infinite Mind, these *must* have existed eternally in that mind. The second thing is, that these thoughts are realities, and this in a sense far higher than that in which any objects in nature can be said to be realities. They are wholly objective to us. They are merely shown to us, and are observed by us in consciousness; but they cannot be modified or affected in any way by the action of our minds in observing them. Abstract thoughts or truths become objects of our perception precisely as material forms do. The images of them are held in our mental view, and are there contemplated by us, in the same manner in which the images of sensible objects are.

The revelation is, then, as certain and necessary in the one case as it is in the other. The difference between the two cases lies wholly in the mode of the revelation. This mode differs, as is made necessary, by the different natures of the objects revealed; but the result, in bringing the image of the object within our consciousness, is the same in each case.

Concerning the revelations of abstract thoughts, precisely as concerning the revelation of objects of sense, we note these things:

First. The mode in which we receive this revelation is the only mode in which, as we are constituted, this revelation could be made to us. Our power of mental perception must be developed by exercise. Out of the infinity of abstract truths which to superior intelligences must stand equally self-evident in their own light, probably as parts of one whole, only a limited number are reached by us, and by most persons only a very few, through slow and laborious processes. Then those that have been so reached are seen by us also in the same clear light. This is obviously the necessary mode of the revelation of abstract truth to man, and the way in which man must cooperate in receiving this revelation.

Second. This revelation of abstract truths, like the revelation of objects of sense, is inclusive, first, of the reality of the objects revealed, and, second, of the correctness of our images or conceptions of them. This form of verification we call demonstration. It is always satisfactory to our minds. We cannot conceive of any additional test, the application of which would render our conviction more certain on either of these points. We see these thoughts to be necessarily true.

Third. We observe the complete adaptation of our minds for discerning this class of objects without the aid of the physical organs of perception. These objects are purely spiritual, and are beheld by our spirits directly. In order that external or material objects shall be beheld by us, images of them must be formed in consciousness, through the medium of our senses. But we form images of these spiritual objects in consciousness without such aids.

The following distinction appears to exist between material objects and these abstract objects. While in the case of material objects the essential nature of each one is shrouded in equal mystery, mystery appears to be predicable of abstract objects only when these are regarded as parts of one whole. This whole is infinitely divisible. The various individual objects, or abstract truths, when

regarded separately, are of widely different natures and are adapted to be apprehended by very different orders of human intelligence or development. To the intelligence perceiving it, each separate abstract truth is devoid of mystery. The mind that comprehends any such truth sees it in its universal and necessary character. Such a mind can observe the practical applications of this thought in the works of the Creator, and can itself intelligently make practical applications of it in its own work.

We may observe here how close are our relations with the infinite, and also how confused are the common ideas of men respecting the real and the unreal. When we have taught a child to comprehend that one and one make two, which is the most simple abstract truth, we have shown to it a changeless reality, that had no beginning and can have no end, that is universal or omnipresent, and that transcends both space and time; a truth, moreover, that exists as a reality, quite independent of any material object to which it can be applied, or of any finite mind by which it can be comprehended. And yet we do not apply the term "real" to this and similar objects, but we reserve this term for objects of sense, which change their forms, and as such objects perish in a moment.

In our relations to what we call material objects, and thus far also in our relations to objects of mental perception, we observe a fact which, by necessary analogy, we conclude to be universal. This fact is, that we are capable of perceiving these objects only in a small degree, dependent on our own powers. In the former case we are able, to a certain extent, to augment our perceptive powers artificially; and in the latter case the powers are capable of different degrees of development in different individuals.

Thus, the limitation to the sights we can see, or the sounds we can hear, is found in the limited sensibility of our organs of sight and hearing. These organs are sensitive to the vibrations or pulsations of light and air only within certain limits. Matter may become completely invisible to us; a fact of which air, water and glass, as well as the disappearance of many substances in solution, afford familiar examples. Perhaps the limitation of our

senses is most impressively shown when we come to employ the the higher powers of the microscope. Objects then appear merely as they would do if they were, in one plane, just so much larger than they really are ; and not the least progress is made towards a knowledge of the constitution of matter. For illustration, we may magnify a diatom, say, twenty-five hundred diameters, which gives a superficial enlargement of more than six million times, and the illumination of the object and the definition of our instrument may be such, that the object is seen with brilliant distinctness ; but, when viewed by reflected light, the minute portion of the surface that is seen appears as substantial as the surface of a shell in our cabinet. We feel a sensation of awe, as we realize that infinity is before us, that it is before us everywhere, and that all the operations of nature are carried on in recesses, into which it is not possible that, while in the body, our senses shall ever penetrate.

So, also, with respect to abstract thought, considered as a whole. Our perception of this varies in degree, according the development of our perceptive powers in this direction. I understand, we will suppose, a little of geometry. I can see clearly enough that the three interior angles of any possible triangle are equal to two right angles. Many propositions equally simple are plain to me. I perceive their necessary character. If, however, one talks to me in the language of fluxions, he speaks in an unknown tongue. No corresponding images present themselves in my consciousness. But since the time of Newton there have been discovered still higher methods of mathematical analysis, which the mighty mind that developed fluxions did not reach. It is well understood that there is in reality no limit to the science of mathematics ; but that for us such a limit exists in the limited power of our minds.

We conclude this paper with the following observations :

First. Two modes of revelation have now been considered, one through our physical senses, the other to the spirit directly, without the employment of any media for this purpose. These two modes of relevation are totally

distinct from each other. Each one is exactly adapted to the nature of the objects that are revealed through it. Both alike result in producing in consciousness distinct images of the objects, so far as the revelation of them is made to us.

Second. Acquaintance, in any degree, with the first of these two classes of objects does not give the power to affirm anything whatever respecting objects of the second class. The attempt to do so would be regarded as an absurd presumption and impertinence. No one ever thought of such a thing as to assume that his skill in perceiving material things could give him a warrant for saying, or for believing, that any abstract or spiritual object had no existence because he could not see it.

Third. The complete reality of all things, whatever be their nature, is something far beyond our power to comprehend. In other words, whatever may be the mode in which these realities are revealed to us, such revelation is made only in a slight degree, a degree ample, indeed, for all our possible uses, and ample also for the employment of all our powers, but, in every case, bearing only a small relation to the unrevealed reality.

Fourth. The perception or the realization of the partial nature of this revelation comes to the mind gradually, as it progresses in development. In every case this perception is most clear to those whose acquaintance with the particular subject is most profound.

None will question the correctness of these statements. Each one of them is sufficiently obvious. The second one especially may be regarded in the nature of an axiom. Their importance will appear as we advance in our argument. We shall have occasion to observe their application to subjects of the highest nature; applications which, when the universal character of these propositions comes to be apprehended, the mind naturally, and indeed necessarily, makes.

MATERIALISM.

The subject of materialism lies here right in our way, and demands attention before we advance to consider the revelation of the spiritual realities of force, truth, love and beauty. Materialism is the manifestation of the blindness of physical science. It is, indeed, strongly resisted by many scientific observers, in whom zeal and eminence in the various paths of experimental research are found united to deep spirituality. In spite, however, of the influence of such minds, it can hardly be questioned that the present prevailing tendency of scientific thought is materialistic. There are several reasons why this is to be expected.

Materialism consists essentially in limiting the thought, more or less closely, to the objects of sense that first arrest the attention. Our relations with the physical creation are so intimate, the changes that matter has undergone in time past, and which it undergoes under our observation, and under our own hands, are of such immediate and practical importance, and the useful properties of its innumerable forms are so varied, and so essential to our wants, that attention is naturally first drawn to, and occupied by, these more obvious features, before it can penetrate to the spiritual realities that are manifested through them.

Then, again, the study of the phenomena which nature presents in its many scrolls, forever being unrolled, demands minute observation, and long-continued fixedness of thought; and so the tendency of this study is, especially at first, to render the mind indisposed, and in some cases positively unable, to look with any concern above a field which it sees to be so important and so boundless.

Undoubtedly the chief reason for the present abnormal influence of scientific pursuits is their novelty. Physical science is the birth of yesterday. We are in the midst of its discoveries. The attitude of the scientific mind is to a great degree that of the learner, absorbed in details, and to whom as yet these details are everything.

So it results that the legitimate spiritual influence of the physical creation is often felt the least by those who are especially devoted to its study. On the one hand, the tendency of all such investigations is to cultivate a devotion to truth for its own sake, to develop a spirit of dispassionate inquiry and conscientious fidelity, and to form habits of close discrimination. But, on the other hand, the necessity for following nature into deeper and deeper recesses exercises the mind in considering the minute rather than the great, the particular rather than the universal, in analyzing rather than in combining, and tends to fix the attention upon what appear to it as material things, which address the mind through the physical organs of sense, and which can be measured and weighed, as if these were themselves the ultimate subjects of thought.

Thus there comes to be shown by many devotees of physical science a remarkable willingness to grind in the prison house of phenomena, and a disposition to ignore, as subjects for scientific inquiry, the spiritual realities that are manifested through all physical forms of being, and also the spiritual perception through which those realities are made known to us.

Respecting the essential nature of what we call matter, we are wholly ignorant. Taking its forms, as these are presented to our senses, we have resolved combination after combination, until our means of analysis have failed; and in this way we have arrived at what we term "elements." Observing the reverse of this process, as it goes on in nature, we find these supposed elements combining with one another in invariable modes, and then we see the compounds thus formed combining with each other, or separating, so that their constituents may enter into different combinations; all in obedience to forces which are revealed only in these effects. Thus there is presented to us a wide diversity of forms and properties of matter, within what we call the inorganic creation.

Then, under the power of another class of forces, more mysterious still, we see these elements and their compounds entering into new combinations of a far more complicated nature, and in these combinations exhibiting

forms and properties far more varied and remarkable. Now there appear organisms, activities which come within the reach of our observation, growth and reproduction, followed, after a longer or a shorter period, by decomposition and a return to inorganic forms of being.

In this stage we witness the united and concurrent action of all physical agencies, as light, including rays that do not affect our visual organs, heat, the gases which compose and which are contained in the atmosphere, water, and mineral forms of matter, each one performing its necessary function, and all harmoniously cooperating, in the work of clothing the earth with the varied forms of vegetable life.

And now there is seen a greater wonder. When matter has reached these higher combinations, and has become organized under the action of the vegetative forces, then, and not until then, it becomes endowed with the power to sustain animal life; and in its more highly organized forms, as, for example, the fruit and not the wood, the grain and not the stalk, the flesh and not bone or hide, it is adapted to support the life of man.

In thus sustaining animal existence, matter yields obedience to a still higher class of forces, and enters into additional combinations of a still more complicated nature, and organisms of a different and higher character appear. Now there come forth beings, with consciousness and faculties and purposes and character.

As in vegetable life, so here also, the submission that matter yields to the higher forces is only temporary, and a constant tendency appears to return to inorganic forms. In animal life we witness again the successive phenomena of growth and decay of the individual, while the species is perpetuated by reproduction.

It is to be observed that in animate being there are manifested two distinct orders of force. The first of these consists of the merely vital forces, which act to sustain animal existence, independently of volition or even of consciousness. The second class comprises the conscious and voluntary activities which supervene to the merely animal existence. The latter forces are of a nature higher than the former, as those are higher than the vegetative forces, and

as those in turn are higher than the forces that are manifested in inorganic being. Thus we have presented to us four distinct classes or orders of force, which together constitute a series, ascending by high and abrupt steps. But all alike manifest themselves only through matter. And, so far as we are yet able to discover, the same elements reside in each of the forms of being, and constitute the rock, and the tree, and the bird, and man endowed with intelligence to observe them all.

One would expect that, surrounded by these wonders, himself the crowning wonder of all, man would be profoundly impressed with a sense of the superficial character of the little that he can know, and of the infinite depth of that knowledge which is hidden from him. Upon many minds, indeed, this effect is produced in different degrees, but it is remarkable how many thinking men exhibit an inclination, more or less decided, to rest satisfied with that which they imagine they can understand, and with repeating the very words they have been taught, and to make these the boundary of their thought. Inquire of such a person, for example, respecting that mystery, the cause that determines the colors of bodies, and he will explain to you, as it has been explained to him, that each body absorbs the other rays of light, and reflects only rays of the color which it appears to have. His own questioning is satisfied, and so he supposes that he has told all about it.

The atomic theory constitutes the present bulwark of materialism. This theory, proposed by Dr. Dalton, in the early part of the present century, as explanatory of chemical action, was the work of a comprehensive mind, and was a great step in advance of the previous chaotic condition of science. It has accounted, or has appeared to do so, for all observed phenomena.

As held at the present day, it is, briefly, that each one of the assumed elemental forms of matter consists of material atoms, of definite forms and dimensions, indestructible and indivisible, and that these atoms are separated from each other, even in the most dense substances, by mensurable distances, which are fixed by an equilibrium of attracting and repelling forces; that between the atoms of many different substances there exist attractions, vary-

ing greatly in degree, but which are always the same between the atoms of the same two elements; that when the atoms of different elements are brought together, under conditions favorable to their union, these atoms exercise selection and choice, and those which have the strongest affinity for each other unite in definite proportions, and so form what are termed molecules, which in their aggregation appear as compound substances; and finally, that these molecules also combine with one another in endlessly varied ways, and that by these combinations of atoms and molecules the whole inorganic and organic creation is constituted.

The atoms must be exceedingly minute, so minute, indeed, that even those molecules which comprise the greatest number of atoms, as, for example, those which constitute the most highly organized forms of matter, are themselves so small, as to be, not merely beyond the power of the microscope to discover them, but beyond its power to make any sensible progress toward their discovery.

The atoms were at one time described as being infinitely small, whatever that might mean. Latterly some definiteness has been attempted respecting their dimensions. For example, the smallest drop of water that can be distinguished in the microscope is about $\frac{1}{800}$ of an inch in diameter, and it is said that each one of these drops of water contains about 8,000 millions of molecules. The molecules are believed, moreover, to be small relatively to the spaces which separate them, and in these spaces to be in a state of ceaseless vibration. These vibrations are considered to be the cause of the phenomenon which we term heat. It is supposed that the force or amplitude of the vibrations, determines the degree of heat, and that the complete cessation of them would be the absolute cold. These are the leading features of this celebrated theory. The manner in which it seems to account for the phenomena of heat, both sensible and latent, has been regarded as affording strong confirmation of its truth.

Our advance in knowledge is, of necessity, made one step at a time. These steps must often be separated by long intervals, and each one, when taken, naturally ap-

pears to many minds to be the last. The atomic theory was a great step, and the philosophic mind has rested upon it for a time proportionately long. But the world is now prepared for another step. This theory does not get beyond mechanical divisibility. It encourages, and probably grew out of, the disposition to contemplate the atom rather than the force. In the material atom it fixes a point of beginning, which, though far removed from our sight, is quite within our comprehension, for we made it.

An amusing illustration of the limitation of philosophic thought to the material atom, and of the satisfaction which our education enables us to derive from what is in reality utterly unsatisfying, is afforded in those numerous cases, in which the same element or compound constitutes two or more substances, which have entirely different characters. Chemists tell us that in these different substances the atoms or the molecules are differently arranged, so as to constitute geometric figures of different forms, and they really suppose they have explained the whole matter. It is obvious, that on the assumed data of material atoms, and of the formation of all substances by the assembling together of these atoms, or of the molecules formed by their union, this is the only thing there is to be said ; and it is equally obvious that this bold guess work affords no explanation at all, and that these phenomena point to something beyond the limits of our present knowledge, as their cause.

All analogies are opposed to the doctrine of material atoms Let us first apply to this doctrine the analogies that are furnished by mechanical science. This science teaches us to look with extreme distrust upon anything that is the creation of our own minds. Whenever, in the process of mechanical development, our conceptions are brought to the test of actual experiment and observation, we have seen that they are almost invariably shown to be illusions. In almost every case, we find that we had not reached the bottom of the subject. The history of mechanical progress is a history of surprises and disenchantment. This experience in mechanics is so nearly a uniform one, that the engineer is compelled to reason in this way with respect to the notion of material atoms: "Is this a con-

ception formed respecting that which lies wholly beyond the reach of our observation? Yes. Then there is no reasonable probability that it can be true. Unknown conditions are sure to exist, and these, if known, would almost certainly show the conception to be an idle one."

We are in fact mere tyros in knowledge. How absurd then to suppose that we can form a correct conception of the ultimate condition of what we call matter. In every research, we soon arrive at a point where our powers fail. It is a general observation that, as the path of knowledge widens it grows fainter also, until it becomes lost in mystery unfathomable.

Chemists have found sixty-three substances that they cannot resolve, and so of course they have concluded that these cannot be resolved, but are the elemental forms of matter, constituting a good solid foundation of all things, a substantial starting point in the search after physical truth.

One cannot help being reminded of Fahrenheit, who first constructed a mercury thermometer, about one hundred and fifty years ago, and who, as is supposed, himself believed, and at any rate induced scientific men of that day to accept the idea, that he had found the absolute cold, which point he named zero. This fitly illustrates the absurdity of assuming as absolute points which really mark nothing except the present limitation of our knowledge.

There is in truth no warrant at all for the belief that we have arrived at any primal element. It is unphilosophical to suppose that the process of combination, which we behold extended to such extreme complexity, with the manifestation at each successive step of properties more and more astonishing, actually begins at a definite point which we have ascertained, and that the ultimate forms of all things are thus brought within our comprehension.

In fact the philosophic mind is already showing signs of outgrowing this belief. We seem likely to pass through this to a higher stage of knowledge before very long. Inquirers are beginning to search after the unit atom, with a strong probability that the inquiry will lead, as many an one has done before, to results of a nature quite unexpected. The resolution of any supposed principal element

would be a blow to the atomic theory; not that the belief in material atoms could not be extended so as to embrace such new conditions, but the confidence of philosophers in all such assumptions would be lost, as unquestionably it ought to be.

We have considered the existence of the atom, or ultimate indivisible unit of matter, to be an assumption. It is, however, rather a conclusion from another assumption. This latter assumption is, that force can be exerted only between bodies. Men had observed that the earth attracts falling bodies, that the magnet attracts particles of iron, and that the non-conductor, when electrically excited, attracts or repels the feather, and they naturally extended this idea, so as to embrace a similar action far removed from their sight. They assumed that there also something must exist, to attract and to be attracted. This analogy is still clung to, and men profess to be satisfied with it, although it is obvious, that the phenomena which are presented in chemical action are only suggested in the most general way by attractions that act through sensible distances.

With respect to this subject, it is to be observed, that three phenomena are known, namely, force, choice, which is termed by chemists elective affinity, and uniformity of action. To these there must be added the properties that are exhibited by the supposed elemental forms of matter, and by their various combinations. These properties, which vary with each elemental or compound substance, are evidently intended. They are in all cases essential to subsequent effects produced, each one contributes to some ultimate result. They cannot, therefore, be conceived to be accidental. Only one alternative remains. They indicate a purpose.

Four realities, then, certainly exist. These are force, choice, uniformity of action, and a purpose that directs every act. The first three of these reveal themselves directly. Indeed they are assumed in the argument for the existence of the atom. The last one we have seen to be manifested no less certainly. Now these four realities are not only certain ; they are also sufficient. The material atom is superfluous. Faraday's definition of the atom,

as a point of force, has the merit of not assuming the creation of our own fancy to be a reality. The fact that we are not able to form a definite conception of a point of force increases the probability that the expression may contain the truth.

The belief in the existence of the material atom has, in fact, no other basis than our education and habit of thought, or rather, our habit of not thinking. This belief is pretty strongly intrenched in authority. The general idea of atoms, as self-existent entities, is derived from heathen philosophy, and mankind have been more or less familiar with it for twenty-three hundred years. Science, however, pays no regard to human authority, and if this be disregarded, the case stands thus: In the behavior of what we call matter, we observe *only* force, choice, uniformity of action and purpose. These four realities are established by conclusive evidence. They are manifested through all material forms of being. From them men deduce diametrically opposite conclusions. They are viewed by each mind in the light that is determined by the general direction of its own thought.

On the one hand, the materialist, who insists upon limiting his thought, as closely as possible, to that which is immediately disclosed to him through his physical organs of perception, and which he tries to believe that he can understand, carries on his subdivision of matter to the atom. Here he rests. This imaginary thing becomes for him the ultimate and the only reality. Force, choice and uniformity of action, all which he admits, are viewed by him merely as incidents of the atom. These realities, which even to his own mind are fully established, yet, simply because they cannot in their nature be seen and handled, be measured or weighed, are regarded by him as only incidental to that, of the existence of which he has no evidence at all, which he only imagines to exist. Purpose is something that the materialist finds it difficult to attribute to the atom, and so he shuts his eyes to it. He can see properties of matters. He is compelled, moreover, to admit that all physical results are dependent upon the possession by different forms of matter of these distinguishing properties. But he can't see any purpose; and

this for no reason except that he cannot attribute purpose to the atom.

Singularly enough, while the attention of physicists has been fixed on material atoms so long, that it has come to be all the same as if they saw them, while atoms are as real to them as witches are to Africans, these are in reality an impertinence in the atomic theory itself, as far as this theory is scientific. The only fact that is established by observation is, that substances combine with one another in multiple proportions. All beyond this is guess-work, or the opposite of science. It must in fairness be stated, that this is all that it is claimed to be. We have the *law* of multiple proportions, and on this law is based the *theory* of atoms.

So much for the attitude of the materialist. On the other hand, those inquirers who in observing employ also their spiritual apprehension, whose perceptions are not limited to sensible forms, but who are able also to see the spiritual realities that are contained within and are manifested through these forms. those minds perceive, clearly enough, that we cannot rationally conceive of force, or of choice, or of uniformity of action, any more than we can conceive of purpose, as anything less than attributes of a Being. They reason from their own consciousness. Respecting purpose and choice, they see at once that these are equally functions of mind ; and that neither one, and one no more than the other, can be conceived to be a property of matter. Uniformity of action is seen by them to be nothing less than uniformity of purpose, joined with absolute power of accomplishment. Force, when exerted by ourselves, is the expression of our wills ; and so the only conception of force in nature that can be formed by such minds is, that it is the manifestation of a will.

As, therefore, the phenomena of nature are contemplated by minds which are capable of this spiritual insight, the demonstrated truth appears of the presence and activity of an infinite and changeless Being. All that is observable by them are the attributes of such a Being. There is no point at which such minds can rest, at which their questionings can find intelligible answers, until they rest in the conception of such a personal Being.

The development of the mind, to whose illumined sight all this becomes obvious, will be considered in a subsequent paper, when this subject shall be reached in the orderly sequence of our thought. Such a spiritual insight is, however, assumed to be possessed by the reader, at least in some degree, in the remarks with which this paper will be concluded.

The theory of atoms has been a real help, in the progress of the human mind towards its full development. This theory has served as the necessary step, by which men shall mount, from the gross idea of matter, as these are at first conveyed to the mind by the senses, up to the position from which they can reach forward to the truth. By the contemplation of these imaginary things, far removed from our sight, we have become, or are becoming, gradually prepared for the reception of the awe-inspiring truth, of what has not inaptly been termed "the divine immanency," or the infinite mode of the divine omnipresence.

This truth requires for its complete apprehension only the full development of that spiritual perception, which, however unconsciously, we begin to employ in the apprehension of force. This same spiritual apprehension will enable us to see, that the universe of what we call matter is the infinitely varied manifestation, not of force only, but of all spiritual realities, in their unity, and of the Infinite Being in whom these inhere; and that the creation has its chief value and significance for us as such manifestation.

True science cannot impose a limit to thought, nor tolerate any impediment to its progress. The following propositions must become the axioms of liberated science:

All spiritual realities are fully revealed to man;

This revelation is made in every manner that is best adapted to the supply of his physical and his spiritual wants, and to the development of his physical and his spiritual natures;

An equal apprehension of all spiritual realities is essential to a correct conception even of physical truth.

Of these spiritual realities, force is the one that first compels our attention, but all alike are the attributes and the manifestations of a personal God.

In the educational work that shall prepare the mind for the reception of this true philosophy, mechanical science must bear a leading part. In other branches of physics, students may allow their minds to dwell on the fiction of material atoms, and may even regard these as ultimate subjects of thought. But mechanical science leads the mind directly to force. Mechanics is the first of the sciences to arrive at the distinct recognition of this manifestation of the universal presence; and it must operate powerfully to make, not force merely, but the other spiritual realities, which we shall see to be intimately associated with force, controlling elements in determining the future direction of thought.

Confining our attention for the present to force, we perceive at once that it is necessary that the forces which we are intended to employ shall be manifested to us in ways that shall enable us to employ them. Now from the very constitution of our nature we could know nothing about any forces, except through just such concrete embodiments of them as those which have actually been given to us. The inconceivably varied ways in which forces are manifested are all adapted to our nature, and to the service of our wills and the accomplishment of our purposes. The adaptation of man and these manifestations of force to each other is mutual and complete.

If only we are able to overcome the influence of false education, and the habit of using expressions ready made in the place of thoughts, we shall find it quite as easy to conceive all bodies to be, what undoubtedly they really are, manifestations of force, in modes adapted to our constitution and wants, as it is to conceive them to be aggregations of invisible atoms held together *by* force. The real nature of all things with which we are so familiar is certainly wrapped in profoundest mystery.

When, however, we extend our view, by the method hereafter to be presented, it will become apparent that force is only one of the spiritual realities by which we are environed. It is believed that it is not too much to say that the universe, as it is now shown to us, presents the complete manifestation of all spiritual realities, or the full revelation of the Infinite Being. This may at first appear

to be an over statement, but I am inclined to think that it is the true one, and that there are considerations, which if due weight be given to them, will be conclusive of its truth.

If the revelation of God be made in the creation at all, it seems inconceivable that it should be partially, incompletely or imperfectly made. The divine nature must be a unit, a whole, incapable of division in its expression; so that, if God is revealed in the creation at all, it seems a necessary conclusion that, in reality, in point of fact, he must be completely revealed.

But not to us. Alas! not to us. The knowledge of God that *we* derive from this revelation, or the degree of this revelation to *us*, must of necessity, be limited by the capacity of each individual to receive it. A limit to our perception is formed by the imperfect development of a nature like to the nature of God, by which only such revelation could be fully apprehended. Our natures may be in a condition completely abnormal, so as to repel this revelation instead of admitting it in even the least degree. From this state up to that receptive condition of the soul to which the presence of God in the universe could be imparted fully, or in an infinite degree, the change must be one entirely in our own nature, and not in the least a change in the revelation itself.

In accordance with the universal law of spiritual perception, by which like is possible to be revealed only to like, we are able to perceive the being of God, and his presence in the universe, only in that degree in which our natures become like to his own. Here is found the natural explanation of the fact to which attention was called in an earlier paper, that, of the various manifestations of the divine presence that are made in the creation, men are ready enough to recognize those which they can conceive of independently, and not as such manifestations of God; while multitudes remain insensible to those other manifestations of his presence which, in point of fact, are equally obvious and equally universal, as well as equally necessary to us, our association with which is just as close and our dependence upon which is just as absolute, but which, by the exercise of all our ingenuity, we cannot

separate from the idea of a personal and omnipotent Deity.

Between these two classes of manifestations of the infinite Being, namely, those which can be dissociated from him in our thought, and those which cannot be so separated from him, science, in the present stage of its growth, has assumed to draw a line, and limits its view exclusively to force.

Our subject, however, has only its beginning here. We shall enter the door that mechanical science opens so widely, and within which lies the whole realm of truth in its unity.

In presenting the views above expressed, it has been necessary, in some degree, to anticipate conclusions which will be reached in subsequent papers. This is to be regretted, but it seemed unavoidable. If the reader now has difficulty in yielding assent to some expressions, I hope as he proceeds he may find that those difficulties disappear.

THE REVELATION OF FORCE.

The subject of force as it is revealed in its effects, or of the effects of force, has already been considered. With the effects of force physical science is concerned, but not with the nature of force itself. Science defines force to be *something* that produces or tends to produce motion. It does not inquire what this something is. This is a question about which it feels no interest. The inquiries of science are directed entirely to the forms and degrees of the manifestations of force.

But there are other questions respecting force that are to be asked and answered. The first of these questions is: How do we get our notion or idea of force? We see, for example, water lifted and water falling; we see vehicles and cars and boats put in motion, and kept in motion, by animals, by the wind and by steam; and with these phenomena, as well as with many others, we associate in our minds the idea of force being exerted. How do we get this idea?

Our conception of force is derived from our own consciousness. I am conscious of the exertion of force myself, in one and another of a great number of ways. I observe the effect, in imparting motion to some object, that is evidently produced by each of these exertions of force, and which effect it was, in each case, my intention to produce by such exertion.

I am conscious, also, of resistances which are, in different degrees, opposed by these objects to my exertions of force; and which render it necessary for me to exert my force in corresponding degrees, in order to overcome them, and produce the motions that I wish to impart to the objects.

Then I observe around me effects being produced, in imparting motion to bodies, that are similar to those effects that I produce by the exertion of my own force. When contemplating these effects I am conscious of sensations

similar to those that I experience when exerting force myself. Especially if these effects are the same, both in kind and degree, as those that I have produced, the identity of the sensation is very noticeable.

For example, by working the handle of a pump I am able, with a certain exertion of force, to lift a column of water with a given velocity from a given depth. I see another person doing the same thing. Of course, I at once recognize the fact that he is making the same effort that I was making. Then I see the same thing being done by a windmill, or by animal power, or by a little air engine, or steam engine. In either case, by the same association, and by an equal necessity, I recognize the fact that a force is being exerted by the wind, or the animal, or the heated air, or the steam, identical with that which I had exerted myself.

For another example: I am taught that the atmosphere exerts a pressure of about 14.7 lbs. on each square inch of the surface of every object that is immersed in it. But if I try myself to lift a partially exhausted receiver I get an impression of this fact far more vivid than any words could give to me. I compare this pressure with other resistances which I am accustomed to overcome by my own exertion of force.

These illustrations are sufficient to show the fact, that our perception of force is an act of recognition. We observe an effect, and we feel the same sensation that we felt when we have produced a similar effect ourselves; and so we recognize the same force as being exerted. It follows, that a person not capable of exerting force, or who had in fact never made such exertion, would not be able to form an idea of force. This is undoubtedly true. One, for example, who had never lifted anything could not form a conception of weight. No conception of weight, or of the exertion of force to overcome it, has, by our supposition, ever been formed in his consciousness that could be recalled or revived by any effect observed. He would not recognize the exertion of force, and would be entirely unconscious of either force or resistance. His perception would be wholly limited to the motion that he sees. This is, in fact, continually the case with every one. Few per-

sons, for example, can form any notion from the movements of a steam engine, whether any force is being exerted through it or not. This cannot even be known by an expert, unless he observes some particular part of the engine where to his eye the amount of power transmitted is indicated.

In this manner, then, we form our primary conception of force. We conceive of it as an effort, applied to overcome a resistance, or an opposing force; such as we are conscious of making ourselves. But for this sensation in consciousness, corresponding with that which we have felt when we have put forth the exertion of force ourselves, and which sensation is revived or reproduced when we witness similar effects, we could have no idea of force, as exerted by other men, by animals, or by any natural agencies, nor of the resistances which these forces are exerted to overcome. Enveloped in a universe of forces, a being who had never himself made a conscious exertion of force could form no notion of them, and could have no knowledge of their existence.

This determination of the mode of our perception of force is one of primary importance. This is the invariable mode of spiritual perception. We shall find that all other spiritual realities are, like force, perceived by recognition, and that we are dead to the existence of those of which we are not ourselves capable.

It was observed respecting the perception of sensible objects and also of abstract truths, that the modes of these perceptions were precisely adapted to the natures of the objects revealed, that in each case the mode of revelation employed was the only mode in which the revelation of the class of objects could be made to us, and that this mode of revelation was conclusive, to the mind that was prepared to receive it, of the reality of the object revealed, and also of the correctness of its apprehension of it.

Attention is now called to the fact that the same thing is true of the revelation of force to us by recognition. This is obviously the only way in which we could receive this revelation, and it is conclusive to our minds. No doubt as to the reality of force, or the correctness of our notion of it, ever occurs, or ever can occur, to any one.

We note further that, precisely as it would be absurd for one who could not form in his mind an image or conception of an abstract truth to deny its existence, so it would be as manifestly absurd for one who had no conscious experience of the exertion of force to deny the existence of force.

Our first question, how do we get our notion or idea of force, is now answered, and we pass to the second question: What is force? This is a question of a still more serious nature, but it is one that admits of a definite and certain answer.

Force constitutes one of the quaternion of spiritual realities. Truth, Love and Beauty form the remaining sides of the four-square city. Force is, however, distinguished from truth, love and beauty in two respects. First, it has no opposite, and so has in itself no moral quality. Second, while each of these realities is capable of degrees of manifestation, force is the only one, the degrees of which are comparable and mensurable with precision by man. We are conscious of different amounts or degrees of force, as exerted by ourselves. Starting from these, we are able, by mere multiplication or division, to express force in amounts which, on the one hand, are exceedingly minute, and, on the other hand, surpass our own powers to any extent whatever, and we are able to state and, within moderate limits, to exhibit, these relative degrees of force with exactness.

Forming our idea of force in the manner above described, and which is obviously the only possible manner, we cannot, except by violence, dissociate in our minds the conception of force from the conception of a being, by whom the force is exerted, and whose purpose is accomplished in its exertion. Of this being the force must be one form of manifestation, every exertion of it must be a direct expression of his nature. This we are conscious is the case in every exertion of force that is made by ourselves, and we see it to be the case in every exertion of force that is made by other men and by animals. There is no exertion of force by men or animals that we do not recognize to be the manifestation of spiritual qualities, of a disposition.

Concerning force as exerted by ourselves, we observe that it is not self-active, nor self-directed. It acts indifferently in any direction, for the accomplishment of any purpose, and as the manifestation of any disposition. In order that it shall be exerted at all, there must exist a mind, having a purpose to be accomplished, and a disposition to be manifested.

It is customary to say that force, as exerted by ourselves, is directed by the will, and there to stop, as if a full explanation had been given. When, however, we look closely to find out what is meant by this expression, we find that it does not mean anything. If we search to discover how much progress we have made towards learning what it is that calls our force into exercise, and determines the direction in which it shall be exerted, we cannot find that we have made any progress. If we have done anything more than to substitute in the place of force another word that, so far as this inquiry is concerned, means the same thing, it will be found a very difficult matter to show what this is.

The will is just as indifferent as force. It needs to be called into activity, and to have the direction of its activity determined, precisely as force does. Indeed, force, as exerted by man, is nothing but the expression of his will through physical media. Just as man receives his knowledge of the outer world through his physical senses, so he impresses his will upon the outer world primarily through his physical strength. In the case of a being who does not act through physical media, will and force certainly may be, and so far as we can see they must be, one and the same thing. We have thus far merely found and identified, in the will, the spiritual form of force.

We must go back of the will, and inquire what it is that calls the will itself into activity, and determines the mode and direction of its activity. What is it that controls and guides our conduct? It will be answered: Our conduct is determined by the purpose that we have formed. Still only words. Purpose is only another form of expression, that means the same thing. What has determined our purpose? Why have we formed this purpose, rather than the opposite purpose?

We are now driven back to the real and only spring of all our activity, when this activity is exercised freely. We have reached the *ego*, the very *I*. We have found that which determines all conduct, and constitutes all character. We have arrived at the affections, at the emotional nature, which is, indeed, the whole nature of every being. Here we find the motive, the self-active, and self-directed power. We have penetrated to the engine room, and have found what it is that makes everything go. Here at last is the reality, the free emotional nature *is* force. All that this word has been employed to signify, and to which the application of it is commonly limited, are only those external manifestations or exertions of force which are observable by us through our senses. The self-active emotional spirit is the force itself. It will be found that there is no voluntary exertion of force, for which we are not obliged to go back to our emotional nature, in order to find its primary and essential cause or motive.

It is thus rendered obvious, that the conception of force in nature which dissociates it from the idea a Being is wrong. This conception is just what it claims to be, that is, no conception at all. It merely declares force to be *something*, known only in its effects. If any definite or intelligible idea of force in nature is to be found, it must be, that it is the manifestation of the nature of a Being. We repeat the appeal to our own consciousness. We are compelled to say, that force when exerted by ourselves is the outward expression of the real force within us, which is found in our affections. These are the ultimate and real spring of every free conscious act. Then the only conception that we can form of force in nature, and the conception that we must form of it, unless we refuse to form any at all, is, that this force, in all its varied forms, is the expression of the nature of an Infinite Being.

But our analogy carries us further than this. Our own affections cannot have for their object any form of what we term matter. This spring of our activity is never animated by matter. Something beyond matter determines every exertion of force by ourselves. Matter may often be very closely associated with this outward manifestation of our spiritual activity, but it is always employed only as

a means, never as an end in itself. The real object which calls our spiritual force into exercise, and so determines the outward expression of it, is always a being, either ourself or another. Our own activity always terminates on a being, and every free conscious act is performed with immediate or ultimate reference to a being, but for which being there would be no impulse to its performance, and it would not be performed.

We are obliged to complete our conception of force in nature in the same manner, and to regard it not merely as the expression of the nature of an Infinite Being, but, moreover, as the expression of such a nature with reference either to itself or to other beings. And this is conduct. The fundamental importance of this truth is perceived at once. It changes the impersonal view of force in nature into a personal conception.

I shall not here enter further into this subject, but in subsequent papers shall endeavor to approach the same great centre from other directions.

At the commencement of the Civil War in America, the causes of it were discussed in England in essays and addresses, in which allusion to the institution of slavery was carefully avoided. These discussions were humorously and happily likened to the play of Hamlet with the part of Hamlet left out. So physical science, with its objective methods, like a child whose thought does not get beyond what it can see and handle, endeavors to comprehend creation with the Creator left out. Science is, however, compelled to admit the existence of one reality, that is not revealed to us through our physical organs of perception. Having arbitrarily severed force from its necessary connection with a Being, science is obliged to admit that it cannot form any conception of it at all.

It is interesting to observe, how the very occupation, to which the materialist endeavors to confine himself, of weighing matter, of the existence of which only he is certain, which he can see and handle, is after all nothing else than comparing the degrees of this first spiritual reality—of what is to him the mystery of force.

THE UNITY OF PHYSICAL AND SPIRITUAL TRUTH.

Thus far mechanics has been considered as the science of force. It is more than this. It is also the science of truth. We have seen its power to free the mind from all forms of authority over thought and belief, and to lead the inquirer after truth directly to its source. We have now to observe its influence in a somewhat different respect. It will be shown to render valuable aid, perhaps it should be regarded as indispensable aid, towards the true and healthy development of our spiritual being. It does this by disclosing the essential unity of physical and spiritual truth, and rendering it obvious that truth in its unity can be apprehended correctly only by the spirit in *its* unity.

In introducing the subject of truth, it will be desirable to anticipate, in this single respect, the general subject of a subsequent paper, by calling attention here to the harmony that appears between the physical and the verbal forms of revelation, in this particular of truth.

The law of truth stands written in the human conscience, but the consistent observance of it is beyond the reach of human nature. This law has been inculcated by all sages, and it underlies the legislation of every age and every race. It commands the involuntary homage of man. But, practically, how fearful is the disregard of it.

One great need of the human race is a high and unchangeable standard of truth. The want of the influence of such a standard, rising before men in the midst of the daily affairs of life, inherent in the associations by which they are surrounded, and constantly presented to their gaze, is painfully apparent, not only in the history, but also in the present life, of our race. The difficulty does not lie in the actual want of such a standard. It does not lie in the want of more than one such standards, fully meeting the above described requirements, and in complete harmony with each other. It lies in the fact that these standards have not been regarded by men. The human spirit has not been opened to their influence.

First. The Bible unites with conscience, in erecting the standard of absolute, transparent, uncompromising truth. It is of the highest consequence, as well as interest, to observe that, while the several books of the Bible were written at intervals, extending certainly over more than fifteen hundred years, and by men of great diversity of character, under a great variety of circumstances, and in every different form of composition, this fundamental unity of truth, associated with other unities of a remarkable nature, runs through it from the beginning to the end. Everywhere simple downright truth is demanded, and that in terms expressing the most exalted conception of it, as the foundation of character, on which alone it is possible for the structure of spiritual life to be erected; as the fundamental element of the harmony, which, in the normal condition of the human soul, would exist between it and the divine author of its being, whose first attribute is declared to be truth that endureth to all generations.

Second. We are now to observe how the physical modes of revelation, the nature of things by which we are environed, harmonize with the Bible in this respect, and especially how mechanical science helps us to perceive and realize this harmony.

If we analyze our conception of truth in moral beings, we shall find that this conception involves two wholly distinct ideas. The primary or underlying idea is that of uniformity of action or conduct. We always know what the absolutely truthful man will do under any given circumstances. There can be no doubt or uncertainty about it. We know what to rely upon. This is the first idea. The second is the idea of justice. This man will do exactly what is right, as he views the right. Here the element of human fallibility comes in. He may be mistaken in his view, but what he holds to be right, that he will do. His conduct will be guided by the highest and best motives of which he is capable. This is our conception of truth in moral beings. First, uniformity of action; second, justice in action.

Let us at first confine our attention to the primary or fundamental idea of truth, which is, uniformity of action.

In this respect at least, one who comes to engage in the study of mechanical science finds that he has entered the region of eternal truth. Here nothing can by any possibility deceive or mislead or fail him. He can rest with absolute certainty in the confidence that, precisely as force is seen by him to act to-day, so, under the same conditions, it always has acted, and invariably and forever will act. This is a fact of unspeakable consequence. Not the student of engineering alone, but the whole race of man, in all its relations and employments, relies implicitly upon uniformity of action in nature. This reliance constitutes the foundation of the peace, and the encouragement to the activity, of every creature. Thus we find the primary idea of uniformity of action, that idea which underlies our conception of truth in moral beings, exhibited in its complete and absolute realization everywhere in nature.

It is difficult to conceive even of mere uniformity of action without a moral purpose of some character, either good or bad, beneficent or injurious, loving or hateful, kind or unkind. That is to say, it is difficult to conceive of action without an actor. Or rather, it would be difficult to form such a conception, if we had not from our infancy been carefully educated to do it. Materialistic science has taken our education in hand, and has seen to it that we should be taught, in observing this uniformity of action in nature, to form an absolutely impersonal conception of it. We are brought up on the laws of nature. Truth in nature we are taught to regard as uniformity of action, secured by obedience to law. All idea of a Being, or of a moral quality in any act seen in nature, is carefully excluded from the mind. Curiously enough, the very uniformity of action, which is the fundamental element of moral truth, which is the first thing we have to look for in the conduct of a perfect moral Being, the absence of which would prove at once the non-existence of such a Being, this very uniformity of action is itself made use of to hide him from our sight.

But in reality, nature presents to us the moral element and the Infinite Being in the clearest manner. It exhibits everywhere, not a partial, but the completest idea of truth. It shows us, not uniformity of action merely, but

also the purpose by which this action is directed. If we take a comprehensive survey of the subject we can hardly fail to perceive everywhere this consistent and most obvious purpose. We shall see force in nature to be directed to a single ultimate end, and to be wholly beneficent. In this single beneficent end the infinite diversity of its manifestations have their unity.

Let us commence our survey with the earth itself. We first observe that as the earth flies through space, rotating on its axis, revolving about the sun, and attending him in his grander orbit, it holds by its attraction both man and all his works, and all objects upon it securely to its bosom. This is not a fanciful expression. It is a plain statement of the fact. From a contemplation of this supreme care we may pass to consider, in a comprehensive view, the multiplied and varied operations of all natural agencies. As here we contemplate the harmonious coöperation that we behold everywhere manifested, we cannot fail to perceive that everything is fulfilling its appointed office within a plan. Whether we attempt to comprehend this plan as a whole, or endeavor to explore any separate detail of it, in either case we find our power of observation and of thought transcended. Its grandeur and its minuteness alike overwhelm us.

We are, however, able to apprehend this plan sufficiently well to perceive it to be animated by a central purpose, to the final achievement of which all subordinate results, in their own accomplishment, are obviously intended to contribute. We behold the earth, the air, water, light and heat, with all manifestations of force, together with the inferior creations of both vegetable and animal life, in one grand harmony, ministering to the service of man. All these agencies combine to sustain his being, to develop his powers and capabilities, to supply the means for the accomplishment of his purposes, to provide employment for both his physical and his mental activities and furnish incentives to their exercise, to delight his senses, and to call into exercise all the highest forms of his spiritual activity and satisfy their longings. Thus, in ways endless in their variety, all things minister to support, to illuminate and to gladden the existence of man. There

can be no question about this fact. Every increase in his knowledge, every improvement in his culture, each enlargement of his powers of observation and of feeling, enables man to see the fact with increased distinctness, and in a continually higher sense, that his own being and happiness is the supreme end of the creation over which he finds himself to be the lord whom both things and inferior beings serve. This combined physical, intellectual and emotional existence of achievement and joy in man is, then, the single ultimate and obvious purpose of the unvarying activity that is to be observed in nature.

From any candid consideration of this scheme, above all ideas of power and of wisdom that it conveys, the mind that is itself in any degree beneficent must just in that degree be impressed with a sense of the beneficence that it exhibits. As beauty can be revealed only to beauty, so beneficence can be perceived only by beneficence. So, also, in all references to moral qualities these qualities must be assumed to be possessed by the reader, for if they do not the language conveys no meaning to him.

We note that the grander the intellectual power of the observer of nature, the more he becomes amazed in the contemplation of the mighty plan; and, on the other hand, the more highly his own beneficent disposition is developed the more deeply he is affected by the consideration of the beneficent spirit by which this plan is animated. We seem, then, to be warranted in the conclusion that both wisdom and beneficence are combined in this plan. in degree beyond our power to recognize them, and that the limit to our apprehension of either is found in the imperfect development of wisdom and of beneficence in ourselves.

The reflections thus far made point to the conclusion, that truth in nature is something more than uniformity of action, that it is uniformity of action with a beneficent purpose. But purpose and beneficence are both attributes of a being. We are thus brought to the necessity of admitting, what the spirit of man in its healthy development recognize with exultation and rapture, namely, the existence of an Infinite Being, whose ceaseless beneficence is manifested throughout the material creation, and of which

beneficence man is himself the supreme object. Like the Sabbath, all things were made for man.

In the interpretation of nature, the blind seem thus far to have had it pretty much their own way. We have been taught to repeat absurd expressions, founded upon supposed exceptions to infinite beneficence, as if these were the rule. Men have been captivated by such senseless raving of morbid poets as, "Nature, red in tooth and claw." The earth exerts the inconceivable benefit of its uniform attraction, and the blind try to fix our attention on somebody falling from a precipice. The sun warms all being into glad existence, and the blind see a man sunstruck. The vital air supports all life, imparts joy with every breath, and brings health upon its gales, and the blind point us to cyclones, and so on to the end of the chapter. It is as if we gazed upon a glorious picture, and could see nothing but fly specks on it. The apparent exceptions to infinite beneficence, however, demand thoughtful consideration.

Such is the definition of truth in nature. Uniform beneficent activity. The same definition holds good, also, of truth among men, with an apparent, though not a real, modification, that exists in the nature of things. Beneficence implies relations of superiority and dependence. There cannot be beneficence between equals. Here, evidently, the moral quality of truth is justice. Among men various kinds and degrees of dependence are observed to exist. When considered alone, these differences of condition often seem to be extreme; but when we take a more comprehensive view, we discover that in reality the range of this inequality is very limited indeed. One human being cannot be conceived to be dependent on the beneficence of another in any such a sense as this, that, without the active exercise of that beneficence each instant, in an infinite multitude and variety of ways, he could not exist. But this is precisely the sense, or the degree, in which every creature alike is dependent on that beneficence which is uniformly manifested throughout the creation by which we are surrounded. Compared with this dependence of every being on the infinite beneficence,

the beneficence and the dependence that are possible to exist between man and men very nearly disappear.

Beneficence and justice are, however, essentially the same thing. They have their unity in love. This is the supreme active principle. Its manifestations differ in form as required by the various relations of the beings in whom it exists. Thus love, the moral quality of truth, which between equals manifests itself in act as justice, assumes the form of beneficence on the one hand, and of gratitude on the other, just in the degree that these practical manifestations of it are called for by the existence of the relations of superiority and dependence. These are all the natural expressions of the same sentiment or feeling of love, in different ways, as required by different conditions or relations. These differences of manifestation may even exist in our consciousness, but all these sentiments, if sincerely felt, are in reality one. The same sentiment of love to his neighbor impels the true man to be just, or generous, or grateful to him, as these expressions of his love are demanded by the relations that he sustains. Beneficence and gratitude are reciprocally due, and the former equally with the latter, from man to man, when the relations of superiority and dependence exist between them. In this way, as in every other, justice requires the hearty rendering of that which is due. Thus all manifestations of love, in outward act, are properly embraced under the term "justice." This comprehensive idea of justice extends, it is true, far beyond the requirements of human laws, and far also beyond our ordinary habits of thought; but it is clearly seen to be the true one. The term "justice" properly comprehends every form of the outward expression of love; the rendering of which expression affords, to the spirit in which the sentiment itself exists, and just in the degree in which the spirit is animated by this sentiment, the same joy that is kindled by the reception of it. Truth universal we thus find to be uniform reciprocal just action between moral beings. It is the expression of love and the source of joy.

In considering the subject of truth between man and man, viewed as equals, or the practical application of the principles that have just been dwelt upon, in the daily

intercourse of men, and in their multiplied affairs, it becomes necessary to distinguish carefully between facts and ideals; or, in other words, between truth as the reality of things, and the ideals of truth. For common and familiar illustrations of this necessity, we may take our commercial measures, the pound, the yard, the bushel. Persons who are accustomed to accuracy know very well that neither of these ideals could be absolutely given in any reality. But the faithful representation of them, in quantities of things merchantable, with the closest attainable approach to accuracy, is honesty. Here we at once recognize justice to be the essential moral element in truth, and also the fact that every act of a being must possess a moral element. Uniformity of action in giving short weight or measure is the opposite of truth.

The ideal, as above illustrated, underlies all material realities. Through these realities, as the only possible way, the mind is continually endeavoring to reach the expression of its ideals. Thus, for illustration, the mechanic has in his mind the ideals of mechanical truth, as of the true line, the true plane, the true cylinder, the true angle or division of a circle, true division of force, of space, and of time, truth of form, and of construction, and of mechanical function. It becomes his highest aim to realize these ideals in sensible form, or, as it may be termed, in concrete expression. To this end he exhausts his ingenuity in devising methods, and his skill in the application of them.

The question naturally presents itself: where is the moral quality found in this form of truth? The answer to this question lies on the surface, as much so as in the case of the true pound, or yard, or bushel, which, indeed, are some of the very ideals that the mechanic endeavors to realize and embody with exactness. In these, and in all other cases, men are dependent on the mechanic for the means of measurement. Upon his ingenuity and skill, directed to the realization of his ideals, in such form that the expression of them can be uniformly repeated, all men rely, throughout their varied intercourse, and in their search after every form of knowledge of a physical

nature. All other men are dependent upon the mechanic for the means by which they shall be able to express, in reality, with the utmost attainable exactness, the ideal physical truths existing in *their* minds, and to discover those which exist in nature. The mechanic is thus called upon to perform a service of fundamental importance, and in undertaking this service he assumes a relation towards his fellowmen, in which justice demands from him the exercise of the most anxious fidelity.

But we need not look so far as this. We may suppose that these uses for his labor are beyond his thought, and that his attention is limited to the truth itself, that he is endeavoring to realize this truth entirely for its own sake. In what he is now doing he has, by our supposition, no conscious relation with his fellow men, but only with his own conception of the mechanical truth that he is seeking to realize or to express. Here the moral quality appears in his fidelity to his ideal. It is obvious that he can be faithful or faithless to this, in the same sense in which he can be faithful or faithless to his fellow men. There exists a moral quality in every possible act of man. He sustains always a relation of some kind, and whatever this relation may be, his conduct must be either true or false, just or unjust, right or wrong.

The moral quality in truth among men is not, however, here at all in question. This is universally recognized. It is the moral quality in truth in nature that I am endeavoring to make clear, and the above elucidation of the general subject of truth is important only in its bearing on this demonstration, as it enables us to see in nature the presence of the infinite moral Being with more distinctness. The moral quality in truth may properly be expressed by the word "faithfulness." Now the faithfulness of God in nature must, as it seems to me, be deeply impressed upon the mind that is capable of just sentiments, when it is considered what the consequences would be, if uniformity of action in nature could ever fail.

These consequences would be of the same character, although unspeakably transcending in degree, those which we observe to follow from deceit, misrepresentation or unfaithfulness in man. Imagination could not conceive the

effect upon the human race of a general loss of confidence in the uniformity of action in nature; a confidence that is so absolute, and upon which all human affairs depend. When we reflect upon this view of the subject, we feel, indeed, that mere uniformity of action is an expression that is inadequate, even to mockery; and that the only rational conception of truth in nature is that of faithfulness on the part of an Infinite Being.

Nothing is more instructive, and nothing can be more fascinating to the ingenuous mind, than the contemplation of this faithfulness, as it is manifested in the unvarying uniformity of the constitution and the operation of all things in nature, and also of our own helpless dependence on this fidelity. From the multitude of illustrations, of this faithfulness on the one hand and dependence on the other, which crowd upon our attention, two, taken almost at random, must suffice here.

The first illustration is this: The constitution of the atmosphere, in the proportions of the two gases, oxygen and nitrogen, which compose it, is invariable over all the earth. Now of all the forms of matter that exist, or that can exist, in the gaseous state, and of all their combinations, it has been shown that this particular combination of oxygen and nitrogen is the only one that can sustain animal life. Not only is this the case, but, moreover, it is found that the least change from the existing proportions of these two gases, even though this be so trifling that all the analytical skill of the chemist is taxed to discover it, would produce injurious effects on every creature that breathes. Our admiration and awe are increased when we consider the fact, that no chemical union or combination takes place between these two gases in the atmosphere, but they exist together merely as a mechanical mixture. A great reason has been found why this needs to be so, a reason which will be stated in its proper connection by and bye. But the mystery which strikes us dumb is, how these indispensable proportions are preserved. If a chemical union took place, then we would imagine that we understood it. But what determines those proportions in a mere mechanical mixture? This is something that we know nothing about. We can perceive or imagine no

necessity. We are shut up to faith that these proportions will be maintained.

The second illustration is this: The earth is not a perfect sphere, but its equatorial diameter is 26.48 miles greater than its polar diameter. This excess of matter at the equator is the effect of the centrifugal force that is developed by the revolution of the earth on its axis. This centrifugal force sustains over all the globe a spherical crescent. The points of this crescent are at the poles. From these it gradually increases in thickness, until at the equator it reaches around the whole circle of the globe the depth of 13.24 miles. That portion of the earth's surface which is now solid, having assumed this general form when in a fluid state, might possible retain this form, although some change had taken place in the forces by which it was originally determined. This, however, could not be the case with the fluid portion. The surface of the ocean is held at this elevation at the equator by this centrifugal force. It stands everywhere at the height that is determined by the equilibrium of the two counteracting forces, namely, the attraction of the earth and the centrifugal force developed by its revolution. A change of one minute in the period of the earth's rotation, or in the length of the day, would produce a change of 196 feet in relative heights of the ocean at the equator and at the poles. Should the day become shortened by this amount, a wave would leave the equator on all sides of the earth and flow towards the poles, sufficient to produce this change.

But we may sleep in peace, and go about our daily avocations undisturbed. Eternal faithfulness knows no relaxation. Unhindered motion continues uniform forever. It is certain that since geologic time began, the relative elevations of land and water on the surface of the globe have not suffered any changes other than those of a local character, and referable to local causes. Even these changes have proceeded so gradually as to have become sensible only after long periods of time. There have been no alterations of a general nature, such as would indicate a sensible change in the rate of the earth's rotation.

Thus mechanical science, using the term in its largest signification, as the science of force, shows us to be envi-

roned with truth; and, moreover, it habituates us to the continual association with truth, in the multiplied forms of its physical expression. In all these forms we have to deal with it continually. The influence of this environment of truth has already been largely felt, although as yet attention has been but little directed to it. Men have been mostly unconscious of its influence. This has been silently but none the less powerfully exerted. From the education that will, directly and indirectly, be afforded by mechanical science, it must result, that mankind generally will come to be more conscious of the manifestations of truth by which they are surrounded. The all-pervading presence of the Deity will come to be more generally felt, and will exert more and more its legitimate influence on human character, The ultimate extent of this influence will undoubtedly be greater and more beneficent than we are at present able to imagine.

In an earlier paper allusion has already been made to the relation that the creation bears to us as our educator. Attention was there called to what was termed the ministry of force. We have now been considering a higher form of this educational influence, which the physical creation is adapted, and was evidently intended, to exert on the character of man, and which we may term the ministry of truth.

The observer of nature has the fact impressed upon his mind, more and more deeply, that the primary law of the universe is truth—uniformity of action, directed by love. He learns also the only way in which a moral being, endowed with a free will can come to be in harmony with this universal law of truth. This must be established, also, as the law of his own voluntary activity, by the perfect development of its motive; so that it becomes the only manner in which it is possible for his volition to act. The necessity for this standard of truth in his own being is not at all affected by the fact, that he finds it too high, not only for his attainment, but even for his comprehension. The attainment of it is clearly the only way in which truth in human beings can be made to conform to truth as set before us in the physical creation.

This ministry of truth can, however, exert but a feeble

influence upon the spiritual nature of man, compared with the mighty benefit that should be received from it, so long as physical truth continues to be falsely apprehended. Philosophers consider it scientific to exclude the Creator from his works. Metaphysicians teach that the mind is composed of separate and unrelated faculties; and the mental activity by which the moral quality in nature can be recognized we are absolutely forbidden to exercise for this purpose.

In all systems of education, a wide distinction is made between physical and moral truth, as being essentially different, and apprehended by us through different faculties or senses. We are taught that physical truth relates to things, and is apprehended by us fully and completely by the exercise of our intellectual faculties; while moral truth relates to moral beings, and is apprehended by us through our moral sense. We are taught that, by the employment of our purely intellectual powers, we comprehend physical science, in all its departments; and with this science moral truth and moral sentiments, and the emotional nature, have nothing whatever to do. We are taught that between the laws of the physical universe and the conduct of moral beings, as between the mental faculties by which the former are apprehended, and the moral sentiments that direct the latter, there exists absolutely no relation. By most persons this would be laid down as an axiom, too obvious for discussion, needing only to be stated. To this height of absurdity have we been brought by a false system of education.

All this elaborate artificial classification has already been shown to be wholly imaginary; as much the idle creation of the mind in its unguided activity as is any system of idolatry. Here we find mankind lost in a morass of falsehood, out of which nothing can extricate us, except the recognition of the absolute unity of truth in its physical and its spiritual forms of manifestation, and also of the unity of the human spirit by which this truth is to be apprehended.

Science would shut us up to the contemplation of law; the highest conception possible to be formed by what it terms the intellect; the imaginary God of this imaginary

member or organ of the human spirit. But the considerations which have been presented in this paper leave no room for doubt that the spiritual element is the fundamental element in physical truth, and that the idea of physical truth that does not embrace this feature of it is incomplete in a vital respect, and misleading in its influence. We are now able to affirm that every physical phenomenon is the act of an Infinite Being, performed with reference, either direct or ultimate, to inferior and dependent beings.

Physical truth is then properly defined as the conduct of God. It is the mode in which God deals with man, and works with reference to man. So, in its essential nature, as well as in the mode of its revelation to us, or apprehension by us, it is not to be distinguished from the conduct of men, or the mode in which they deal with one another.

The recognition of force in the universe, without the recognition of the moral quality in every manifestation of force, as the act of a Being, is as if we should confine our attention to the mere exertions of force by men, without reference to the motives by which these were prompted and directed. The latter is something that the mind refuses to do. We know, our own consciousness assures us, that every act of man is directed by a motive. Then our only possible conclusion is that every act of God is directed by a motive; and the imaginary distinction between physical and moral science, and the modes of their apprehension, vanishes away.

Attention has already been called to the fact, that this distinction, which has been made fundamental in our systems of thought, and the effect of which is so unfortunate, is in reality only a distinction between those truths which *can* be considered without reference to a Being, and those which cannot be separated from a Being in our thought. All phenomena which men *could* consider separately from the idea of a Being they have done. They have formed such partial conceptions of them as they could do when thus cut off from their source, and these conceptions constitute physical science.

The work of the reason, about which we hear continually, is, in all the field of physical science, merely the activ-

ity of the mind in tracing relations, in distinguishing, combining and concluding, based on a partial apprehension of the facts; when the facts of paramount significance are not present in consciousness.

This partial philosophy receives but little check in those departments of science, in which the physical organs of perception are wholly relied upon, in which observation terminates on material forms, and in which it is possible for the thought of spiritual realities to be avoided. But mechanical science, which brings us into immediate contact with the omnipresent reality of force, and exhibits to us immediately the underlying and primary element of truth, contains a power that aids us materially in the discernment of all spiritual realities.

In a former paper we have considered the unity of the human spirit. Our present discussion enables us to affirm the unity of truth. There is only one kind of truth, as there is only one spirit in man to apprehend it. Truth in the physical creation is the conduct of God. Science is the knowledge of the conduct of God. Truth in man is conduct like the conduct of God. All truth involves spiritual being as an essential element of the conception, and requires for its correct apprehension the exercise by the human spirit of every form of its activity.

THE PERCEPTION OF SPIRITUAL REALITIES BY RECOGNITION.

God in nature is the supreme fact of science. Then, of course, He ought to be so regarded. But He is not generally so regarded. There must be a reason for this refusal, and a reason that, when we come to perceive it, will be found fully adequate to account for the fact. This phenomenon, like all others, must have its complete explanation. It is only necessary that this explanation shall be pointed out. This will be attempted in this and the succeeding papers.

The real cause of this phenomenon seems to lie in the mode of revelation, by which the knowledge of all spiritual realities is conveyed to us. It has been shown already respecting force, that this first spiritual reality is perceived by recognition. We become aware of the existence of force only as we recognize it. Through similarity of effects produced, we recognize force as the act of a being; an act similar to efforts which we are conscious of having made ourselves. It seemed obvious that a being who was not himself capable of exerting force could not form any idea of force. It is not necessary to repeat here the exposition of this undoubted fact.

We now note that the other spiritual realities, of truth, love and beauty, are revealed to our minds in the same way, or by recognition. Like force, they are of a nature incapable of being apprehended through our physical organs of perception. Still, like force again, they are revealed to us in some way. In some way, and in some degree, we certainly become aware of their existence. How do we come to have such cognitions? We obtain them in a manner similar to that in which we obtain our knowledge of force. Through similarity of manifestation, in outward act, or visible or audible expression, we recognize that which we are conscious of experiencing ourselves.

This is the only way in which such conceptions can be formed, in which the images of truth, or love, or beauty can be brought into consciousness. We recognize that

which is like to our conscious selves. In addition to this, we also recognize that which is like to our ideal; that is, which is like in kind, only transcending in degree, that of which we are capable ourselves.

As a being incapable of exerting force can form no conception of force, so a being incapable of truth or love can form no conception of truth or love. Any expression or manifestation of these realities in other beings cannot suggest any corresponding sensations to him. He has no experience that would enable him to recognize them. They revive no images in his consciousness. The same is true, also, of beauty; although we cannot well consider the case of beauty until we shall have seen its true nature, and the identity of physical with spiritual beauty, which will form the subject of a later paper.

This mode of perception of spiritual realities is not essentially different from that of the perception of objects of sense. In both perceptions alike an image is formed in consciousness. In the one case this image is like some external object. In the other case it is like some previous sensation. In each case it is only the image formed in consciousness that is contemplated, and that is referred by us to the object, or to the being. For illustration, we attribute whiteness to an object and purity to a soul by mental processes similar to each other, and which are founded upon images that in the two cases alike we have formed in consciousness.

The identity of the mental operations in these two cases ought to be made entirely clear. In physical perception the likeness formed in consciousness always stands to us in place of the reality. The purpose of all care in observation is to form this likeness correctly, and all errors arise from the failure to do so. Every sense is often called into exercise to verify the correct image in consciousness.

So, precisely, we observe the conduct of other beings, and we form images or conceptions of the motives that have actuated them to such conduct, or of the sentiments or feelings that are manifested by it. These images or conceptions we can form in only one possible way. We recognize the fact that by similar conduct we should our-

selves manifest or express such motives or sentiments or feelings. The images of them are revived in consciousness, and we attribute or refer these motives or sentiments or feelings to the person whose conduct we observe. This accounts for the fact, that ordinarily it is not possible for men to conceive of other men as being actuated to any particular conduct by motives different from those that they are conscious would impel themselves to the same conduct.

Another result follows from this mode of spiritual perception. In advance of any conduct observed, it is the spontaneous impulse of the mind to perceive in every other mind the reflection of its own conscious self. We naturally refer the images of sensations and emotions that we form in consciousness, to other minds, precisely as we do to our own. Thus we intuitively expect from others the same conduct, or outward expression of the spiritual state, that would be natural to ourselves.

Among spiritual beings in their normal condition, and for such beings this mode of perception of spiritual realities was evidently designed, this expectation respecting the conduct of each other could never be disappointed. The conduct would invariably manifest the existence of love, and consequently of truth, in every one in equal degree, and complete harmony and sympathy would be the necessary result.

But among men not only are the realities of truth and love developed in very different degrees, and these degrees at the best limited ; but, moreover, each one of these has its corresponding opposite, in falsehood and hatred, and these opposites are also developed among men in endless diversity of degree. These two classes of opposites, in their various combinations, constitute the endless variety of human character.

Under these abnormal conditions the spontaneous inclination still exists in each individual, to see in others only the reflection of his own conscious nature ; to attribute to others the motives and sentiments of which alone he is able to form the images in his consciousness, and to reconcile all conduct observed with such motives and feelings.

This tendency, which is now a mistaken one, becomes

in some degree corrected by experience, in proportion as the judicial spirit is possessed. It is only by the exercise of this spirit that we are able to attribute conduct that is of a character more elevated than we ourselves are capable of to motives that we cannot comprehend or form images of in our own consciousness.

It is obvious that the want of the normal spiritual realities of truth and love, and still more the possession of their opposites, must of necessity render the individual insensible to the existence of the former in other beings. He cannot recognize them. He cannot form images of them in consciousness. He cannot perceive their existence, in the only possible mode of such perception. For him they have no existence. He is necessarily dead to them. This affords the explanation of the fact, that has already been stated, that like can be revealed only *to* like, beauty to beauty, truth to truth, love to love.

The subject of ideals of truth and love, and consequently, as we shall see hereafter, of beauty, is an interesting and an important one. Ideals of these realities are images of them that are formed in consciousness more or less vaguely, because in degree they transcend our own experience, and so exceed our power to form images of them distinctly. It is to be observed, that our power to form these ideals, or indistinct images of degrees of truth and love that transcend our own experience, increases with each increase of our conscious possession of these realities, or, in other words, of our ability to form distinct images of them. The higher the actual attainment, the higher becomes the ideal.

This is in accordance with what is to be observed universally. In looking at any objects of sense, for example, the ignorant man is quite incapable of realizing that there is anything before him that he cannot see. To the instructed mind, on the contrary, just in proportion to the depth of its own real insight will be its further apprehension of the existence of that which is beyond its power to discern. So precisely in the case of these spiritual realities. The greater the degree in which these are really possessed, the more capable the spirit becomes of realizing the facts, of their infinite nature, and of the

limited degree in which it is itself able to form distinct images of them, or to become distinctly conscious of their existence.

When we shall come to consider the combined manifestation of all spiritual realities in their harmony, in beauty, the occasion will present itself for viewing this general subject of spiritual recognition somewhat more in detail. The observations already made seem to be sufficient to show this recognition to be the necessary mode of the revelation of these realities.

THE REVELATION OF GOD.

In the preceding paper a brief exposition was made of the mode in which all spiritual realities are revealed to man. It would seem to follow, necessarily, that the supreme spiritual reality, the Infinite Being, in whom force, truth, love and beauty inhere, from whom these proceed, of whom they are the manifestation, can himself be revealed to us only in the same way, or, by recognition, as our ultimate and adored ideal. The importance of this subject, and the radical error underlying the view of it that is commonly held, and which has become fixed by our education, demand for it, however, a separate and full discussion. It is undoubtedly necessary that the application of this law, of spiritual perception by recognition, to the revelation of God, should be distinctly shown.

When, in another stage of being, our eyes shall be opened, or our power of spiritual recognition shall be enlarged, the overwhelming fact will burst upon us, that God had been before us every instant of our existence, and had been revealed in every possible way; that all things had combined to show the supreme truth of his presence; and that, while the few had faintly and dimly realized the enrapturing revelation, the mass of mankind, through inability to recognize infinite and universal love, had been stone blind to it all. Amazement will fill the soul, as it recalls, in every activity of nature, the ceaseless revelation of God.

The mistaken views and the confusion of thought that prevail on this subject, of our cognition of the being of God, have their roots in the artificial imaginary divisions of the human spirit, and the arbitrary allotment of separate functions to its different supposed organs. Thus it is assumed that the emotional nature has no perceptive power. It is taken as an axiom, that I cannot love, except as first I have an intellectual apprehension of the being that I am to love. The fact that love only can recognize love, and that it is through such recognition that the spirit in its unity obtains its only knowledge of the ex-

istence of this principle, or emotion, or motive to action, in another spirit, is a fact that has not itself been generally recognized. Hence this confusion.

The first step towards a right understanding of this important matter must be to disabuse our minds of the idea that the being of God is, or can be made, in any degree the subject of our intellectual apprehension. This proposition will of course seem a very strange one to the reader who assumes our intellectual apprehension to be our only mode of apprehension. The error lies in this very assumption, the unfounded nature of which I shall endeavor to show.

A disposition still exists among theologians, although less strongly marked than it has formerly been, to exalt the reason, and in some vague way to rely upon it as a source of spiritual knowledge. In this theologians have only followed the prevailing philosophy. They have perseveringly tried to find in the reason the means of reaching the unseen, of attaining a knowledge of what has been called the supernatural. In this they have repeated the folly of the builders of Babel, apparently comprehending as little as they the nature of the structure that shall "reach unto heaven." Mechanical science has made clear the futility of all such efforts. It shows us that the mental processes, which men call the reason, do not afford the means of arriving at any truth, except in the region of pure mathematics; that all realities, both those of a physical and those of a spiritual nature, are revealed to us in other ways. It shows us still more than this, namely, that respecting all realities of a physical nature, our reasoning needs to have its errors corrected by observation at every step. Now the speculative mind loves to get far away from these physical fields, into regions where it is secure from these tests of observation. But the analogies of mechanical science follow it there. There is no escape from the searching question: If in things with which we are most familiar, and where the truth is well established, it is not possible for the mind to advance one step without the certainty of falling into error, what confidence is it possible for us, as reasonable beings, to put in speculations, where our vagaries cannot be corrected? In these highest departments of truth also it is evident that we must seek

for, and recognize, and submit to, the guidance of revelation, if we would have our belief here rested on the same secure foundation, on which we have rested our belief of physical truth. The mode of revelation of the highest spiritual truth becomes, then, the subject of supreme interest.

It occurs at once to one educated in the prevailing philosophy, and whose thought is bounded by its formulas, who cannot receive into his mind the truth of the exclusive perceptive power of love in its own province, to ask: "How can I love God, unless I first have a belief in his being, which belief I arrive at by the exercise of my reason or intelligence?" This question appears unanswerable to those who have been educated to regard love as a mere sentiment, and to rely on what they call their intellectual faculties as the only means of knowledge. According to this philosophy, the knowledge must exist first, obtained in some other way, before the sentiment can have any object for its exercise.

We observe that this question assumes belief in the being of God to be one thing, and love for him to be quite another and a subsequent thing. Such a conception of the subject is apparently fortified by the fact, that the existence of God is confessed by very many persons, who yet profess to feel little or no regard for him. The answer to this question is, that the imaginary being, of whom men can form an intellectual idea, is not God. The understanding leads men astray here as completely as we have seen it to do in the search after physical truth. The God of the understanding is the work of men's imagination. He is not their Creator, but their creature. They have created him, and have made him a being like themselves, and so quite within their comprehension; only greater than they, just as the forces manifested in nature are greater than those which they can exert. It is evident on reflection that the mental process by which this imaginary Deity is formed is not to be distinguished from the process by which men create idols, and attribute their own qualities to them. The utmost that our God-makers do, or can do, is to select their own good qualities or ideals, or those which they believe to be such, and in which belief

they are always in a greater or lesser degree mistaken, and to invest their handiwork with these. Each person has his own ideal, and so makes his own God, about whom his conceptions are generally pretty definite. In the study of all things in nature we are directly lost in mysteries. We may, perhaps, make as much progress towards a complete understanding of common objects of sense, as a miner makes towards reaching the centre of the earth. But when we approach the infinite mystery of the being of God, we are content to create in our imaginations a being adequate to make and to do what we observe to be made and done, and to say: "this is God." This is the work of what we call the intellect, by which we mean here the imagination. As if conscious, however, of the imposition, we are inspired by this imaginary deity to no act of worship, or feeling of love, or exercise of faith. We recognize no personal relation between ourselves and our handiwork.

A chief cause of our error here is to be found in the influence of human analogies, which when pressed too far are always misleading. We observe concerning our fellow-beings, that in order that we shall love them, we must first obtain through our senses evidence of their existence. We form images of them in our consciousness, which images are determined by the reality before us, and with which images we then proceed to associate conduct observed, and sentiments and feelings, which we attribute to them, and which are limited by our own. Thus we naturally get a corresponding idea respecting our knowledge of God, that we must first form an image of God in our minds in some way, and afterwards come to love him. It is necessary that we shall become completely freed from the influence of these misleading analogies. Then when we shall come to look for the process of, first, the intellectual apprehension of God, and, second, the awakening of the feeling of love for the Being that has thus been intellectually apprehended, we shall find that there is no such process; but that our only possible apprehension of God that is true, in the degree that we are able to form it, is that apprehension that is formed by the recognition of love alone.

Science affirms God to be the unknowable and the un-

thinkable. In this declaration science is right. Its error lies in paying no regard to the real mode of spiritual perception, by which the revelation of God is in fact made to us, and which is the only possible mode of such revelation. But this conclusion of science that the human intellect is incapable of arriving at any knowledge of God is not new. It was anticipated long ago. "Who hath known the mind of the Lord?" "Canst thou by searching find out God?" "The heavens are higher than the earth, so are my ways higher than your ways, and my thoughts than your thoughts." The living force of this language, and of other expressions of similar import in the Bible, contrasts in a striking manner with the lifeless formulas of philosophic construction. The contrast is, indeed, no greater between the language, than it is between the reality, of the two cases. The first marks the hopeless end of philosophic thought. The second is the sublime beginning of revelation.

But while ignorant of the true mode of this revelation, we cry: "If God be, indeed, the unknowable and the unthinkable, then he has *not* everywhere revealed himself to us." "Then it is not true that our whole being, with all its powers, has been adapted to the supreme purpose of beholding him." Peace, troubled soul! How should the infinite be revealed to the finite? A very slight exercise of the understanding would seem sufficient to show how futile the search after God must be, that is conducted within the limits of human processes of thought. If man were only a reasoning machine, then mere uniformity of action expressed as law would be his ultimate conception. Then it is cetain that not God alone, but all spiritual realities, would be hidden from him. For him they would have no significance. He would be without power to recognize their existence.

In accordance with the law of all spiritual perception, and, indeed, in accordance with the law of perception universally, we perceive the being of God only through the spontaneous and necessary recognition of him by the spirit in its activity of love. As all the manifestations of God, in the modes of force and truth and beauty, have their unity in love, as love is the essence of the divine nature,

and the motive to all divine conduct, so also the affections constitute the whole spiritual nature of man, and the motive to all his activity. If these are in their normal state, then they are in entire harmony with the nature of God, and the spirit necessarily recognizes his universal being and presence. If the spiritual nature of man is not so in entire harmony with the divine nature, then it can recognize God only in degree, in such degree as it *is* able to form the image or ideal of him. If it does not spontaneously form such image or ideal in any degree, then it must be dead to his existence.

For the correct apprehension of this, the only possible mode of the divine revelation, it is necessary at first that we should consider man, not as in fact he is, but as he would be in his normal state; a state in which universal love is the ceaseless animating force, in which every thought is suggested by love, and every act is the expression of love. In this normal state, man would necessarily be conscious of his environment of universal love, and this is God.

The being and the love of God are convertible terms. This was true of the divine man. It would also be true of man universally in his normal state, which we are now supposing. In this state, love in man would differ from love in God only in degree, according to the capacity of his nature, love in God being infinite. In this normal state, man would receive the revelation of God, in becoming conscious of the universal reciproicty to his own love. He forms no conception. He only loves. Every other being is equally the object of his love. He is conscious of love in return from every other being. Above all he is conscious of an environing Being, who is infinite love. The latter recognition becomes necessary from the fact that in this state man has been made in the spiritual image of God, and must recognize his own likeness or ideal. He feels the spontaneous and supreme impulse to love, and also the corresponding longing for love. In the complete satisfying of this longing he recognizes infinite love, and becomes aware of the harmony of which he forms a part. The conscious particular recognizes its universal.

In this normal state, the spirit *must* see God, precisely as the open eye must see objects in nature, or as the mind must recognize familiar truths, and that for the same reason, namely, that this recognition, and consequent communion and joy, are the very purposes for which man's spiritual nature, with its power of perception, was given to him, the end to which it was especially adapted and which it was evidently intended to serve.

God having been first revealed in the spirit, the universe is then seen to be the manifestation of his love, and becomes animate with his presence. Everything then appears in its true character, as a mode of the endlessly varied activity of infinite love; and the spirit rejoices, with rapture unspeakable, as a being receiving, and responding to, and so communing in, that love.

This recognition of the soul is, then, the mode of the revelation of God. But to us, in our abnormal state, this revelation is, of necessity, dim and obscure, even at the best. The direct and immediate recognition of God by the soul is feeble, on account of the feeble degree in which universal love is developed in our natures. The external perception of his presence is necessarily imperfect in the same degree, for we can see, or can recognize without, only those spiritual realities that we have already felt within. Among men, therefore, the revelation of God, or the spontaneous recognition of God in the soul, must be a matter of degree, according to the development in this respect of each spiritual being. In this degree, and in this degree only, every physical sense becomes a medium, through which the sympathizing spirit recognizes its own image or ideal, and so in part beholds the activity of universal love.

It should be observed that, while to man in his normal state the recognition of God must be complete up to the full capacity of his nature, still this recognition can never become complete, in anything like the absolute sense of that term. The true conception of perfect beings must doubtless be that of endless growth, with always an adoring consciousness of depths unfathomed of love in God.

The idea is a prevalent one, that love to God may result as an effect or consequence of the purely intellectual study

of his works. This is the same error that has already been exposed, only modified in its mode of statement. Strange as it may at first seem, the fact is, that where love to God, or, correctly speaking, that love by the spontaneous activity of which God is recognized or revealed to us, does not already exist, in some degree at least, the effect of the study of his works is invariably to hide him more and more from us.

On reflection, the necessity for this result becomes apparent, and it affords a full demonstration of the correctness of the view of spiritual revelation that is here taken. In the case supposed there exists, if not a positive antagonism, at least a complete want of sympathy or harmony, between the soul and God; and therefore the spirit cannot perceive him, has no power to recognize his existence.

In its merely intellectual activity the spirit of man works mechanically. This mechanism itself feels no interest, forms no purpose, provides no impulse. It works in any direction indifferently, as impelled and guided by the emotional nature, by the *I*, by love or hate, in the degree of its development, either to build or to destroy. Even in the study of nature for the very purpose of finding evidences of design requiring a designer, when the thought is arrested here, the understanding itself is as indifferent as is the eye to the shape of an image that is formed within it, or the hand to the purpose for which its muscular power is being exerted.

Thus it is clearly shown that the recognition of the being of God does not wait upon, or in any manner depend upon, the manifestation of God to our senses. On the contrary, this recognition must have been made by the spirit already, in the only possible way, namely, by the spontaneous action of similar love existing in the soul, responding to its universal environment of divine love, in order that the sensible expressions of the love of God shall be discerned at all. Otherwise the spirit is dead to them all.

This is a fact of ordinary experience. That all the common and familiar operations of nature are in reality the manifestations of the infinite love of God, in its ceaseless activity, is an idea that no man, whose nature is not, at

least in some degree, in harmony with the divine nature, is able to entertain for an instant. That all force is the personal act of the omnipresent God, extending not only to the most common and minute things, but, moreover, in everything extending to where minuteness becomes lost in infinity, this to such a mind is foolishness. A remarkable feature of the case appears in the fact, to which reference has already been made, that the unvarying uniformity of all natural operations, that very characteristic of them which is fundamental in our idea of truth in moral beings, that is the necessary expression of eternal faithfulness, is the feature that operates most effectually to hide God from the sight of men. They could recognize superior power in exceptional phenomena; but the changeless love that shines in the life-giving sun, this they cannot see. The very constancy of the beneficent conduct of God thus absolutely forms a barrier to his recognition.

Again, wherever God has not already been spiritually recognized, the perfection manifested in every part of the creation, and the harmony that pervades all natural operations, produce on the mind the same blinding effect. While the illumined spirit, united with God in the harmony of universal love, rejoices in the manifest glory of the Infinite Father, the merely philosophic mind, according to the present limited use of this term, or the mind that is shut up to merely intellectual processes, sees only the ordinary and regular operations of nature. With this absolutely impersonal, and therefore meaningless expression what is now called the philosophic mind rests quite satisfied. Beyond this it feels no interest, and therefore it can discover nothing.

If, then, we can only become freed from the influence of a false education, which has itself been directed by blind philosophy, we shall be able to perceive clearly enough, that our belief in, or knowledge of, the true and living God cannot precede, but must wholly consist in, the spiritual recognition of the soul in love; and that the effect of this sympathetic union with God is, that the spirit becomes illuminated to see that which was before invisible, to which it had been completely insensible, and that now, under the impulse of normally awakened affections, the

thought can no longer stop nor be arrested until it has penetrated into the universal presence of God, and contemplates in all things the working of his infinite love.

The truth of the view that has been here presented is shown in its power to clear away the cloud of difficulties with which this subject has been darkened, and which have produced a disastrous effect on many minds that have been earnestly seeking for the light.

It has been taught, and generally assumed, that the God of nature, or God as revealed in nature, is a Being who is intellectually apprehended by us. We are indebted for this idea to what is known as the science of Natural Theology. Now, our argument has certainly advanced far enough to expose the absurd falsity of such an idea. The God of nature is certainly identical with the God of grace.

Then the difficulty has always been felt to be a serious one of connecting this supposed God of nature, or God as intellectually apprehended, with the infinitely loving, merciful, forgiving Father who is revealed in the Bible. A chasm has seemed to separate the two. And well it may have done. For the supposed God so intellectually apprehended has no existence. This is another of the fictions of the human mind. There is no such Being. The true and living God is not intellectually apprehended. It suits human pride to assume that the intellect of man must have something to do with our perception of God; but human pride is itself the great obstacle to this perception. All truth must be sought in the deepest humility. This is preëminently the case with the highest truth of all. It is God dwelling in us, actually present in our consciousness, whom we recognize. The Apostle John expressed the truth exactly when he said: "He that loveth not knowth not God, for God is love."

The spontaneous activity of the spirit in love is to be observed in little children. All that the conscious spirit does, before it can reflect or understand, and prior to any experience, is to love and trust. The latter act rests upon the assumption of universal love like its own. Manifestations of these feelings of love and trust constitute the child's first signs of recognition. That love and trust are

natural and intuitive is shown in the universal fact, that the child is delighted by manifestations of responsive love, and is grieved by the want of them.

We are inspired with new admiration when we observe that, as it is the most important of all things that we should have this knowledge of God, or this power to recognize him, so the activity of the spirit in love, by which activity, just in the degree that it assumes a universal form, God becomes spontaneously recognized, is the earliest of all spiritual activities to be developed and exercised; and also that all the endearing relations of life, symbols of the far closer relation of the soul to God, as these relations appear in succession from the opening to the close of our earthly existence, unsealing successive fountains of happiness, are adapted and are evidently intended to preserve the love and trust of infancy unblighted. Here we recognize the meaning of the command of the Christ, that we must become as little children. We see it to be merely the expression of a command that exists in the nature of things. Care and trust are the reciprocal expressions of the same love, on the parts, respectively, of protecting and of dependent beings. The former expression actually does exist, and the latter is possible to exist, between God and man in infinite degree.

In concluding these observations on the revelation of God, attention is called to the fact that this revelation, like the revelations of inferior truths, is of a nature adapted to bring to the spirit receiving it the full and entire conviction of its truth. The spirit rests in this sure belief. This contrast is to be noted between this revelation and all superstitious beliefs, that when the revelation of God has been received in this manner, then the more comprehensive the knowledge, and the more profound the intelligence, the more certain becomes the truth of the revelation.

It is further to be observed, that we can never rise above the analogies that are afforded by mechanical science. As in that science, so here also, experiment is the only source of knowledge. Men can only idly pretend to reason about that which they have not experimentally established. The personal relation of the soul of man with God is something

that can only be known experimentally. It is obviously impossible for the mind that has not received the knowledge of God by the recognition of his infinite and universal love to know anything about it. And for such a mind to deny the existence of God, to discuss the subject of his being at all, or to entertain any opinion whatever concerning it, or respecting the whole matter of the relation of man to God, is clearly just as absurd, as we have seen that it would be for one to reason about the existence of any objects which are not revealed to us through any process of reasoning, or, on the other hand, for one who knew only about objects that are revealed through the physical senses to express an opinion about the existence of abstract truths.

THE VERBAL REVELATION.

We have now finished our brief and necessarily very general survey of the physical and spiritual modes of revelation. These modes have been seen to vary, as is rendered necessary by the varied nature of the truths revealed. We have observed that every bodily sense, and every mode of activity of the spirit, are called into exercise, to serve as media for the revelation to man of physical and spiritual truth, and that each one of these in its office, and the spirit in its unity, are adapted for the transmission and the reception or apprehension of every form of truth. This adaptation includes, of course, historical truth, which has not yet been considered.

There remains an auxiliary to all these provisions for our reception of revelation in its varied forms, and that is the gift of language. This is the gift by which our spirits communicate with one another. It is, perhaps, rather to be regarded as a mode of communication than of revelation.

Language has this supreme use, that it is adapted for the communication to man of truths of the highest consequence, which, being historical in their nature, could not be imparted to him in any other way, as well as of those truths, to the natural revelation of which we are, in our abnormal state, nearly or quite insensible.

We have that which claims our acceptance as such verbal revelation. We have a book, which purports to be the actual employment, by the Giver of language himself, of this highest physical gift for its highest possible use. The question presents itself: Is this book to be accepted as true? Written by men, as necessarily it must have been, did the Bible, nevertheless, emanate from the Infinite Mind, the source of all truth? Are its words the words of God, or rather, in all its essential teachings, is it the word of God? For the determination of this question, our present subject suggests a line of inquiry that seems to be in its nature fundamental and searching. It suggests the question: Is this book in harmony with the physical revelation? Is the God of nature also the God of the Bible?

The God of nature is seen to be a Being of infinite, universal and changeless love. Having first been spiritually recognized, He is then seen to fill all things. These are then seen to have their supreme use as the universal manifestation to man of the being and nature of God. Is the same manifestation contained also in the Book?

When we approach this subject, the fact that first presents itself is, that the Bible declares the existence of one God; not of a divided sovereignty, nor of inferior divinities, but of one Jehovah. Nature declares this to be the truth. The unity and harmony everywhere observable forbid any other supposition. Science has been truly said to be the grave of polytheism. At the outset, we find this fundamental agreement to exist between the Bible and physical revelation.

Again, the Bible declares God to be a spirit, whom no power has been given us to discern, admitting of no manner of similitude, of whom our spirits, in their form constructing activity, can create no image; but with whom we have relations far more close than we are able to conceive, and with whom, moreover, our spirits may have immediate personal communion, the intimacy of which has no limit except that which is imposed by the imperfect nature of our love, or, in other words, by the limited degree of this form of our spiritual activity.

On this precise point the corroboration afforded by Nature is necessarily in some degree negative, but it will be seen that it is hardly less conclusive on that account. nature assures us, first, that God is so completely hidden from us, and, second, that this fact does not afford the least reason for doubting His personal existence, His universal presence, and our own personal relations with Him. The better we become acquainted with nature, the more distinctly we are made to see the extreme limitation of our perceptive powers. It is, of course, obvious that these do not extend to the direct perception of any form of spiritual being, which, nevertheless, we know to exist. But very far within this limitation, we find that our knowledge of the physical forms of being, while ample for all our needs and uses, is extremely superficial, that the reality of all material things is far beyond our sight. And yet we know

this reality to exist. The tendency of all research is more and more to check human presumption, and to induce an humble and a reverent spirit, in view of the exceedingly narrow limits of our actual knowledge, and the infinity of even physical truth.

With respect to the eternal self-existence and omnipresence of God, Nature and the Bible are in full accord. Both alike also represent God as a Being of infinite and unchangeable truth. This harmony has been already set forth in an earlier paper.

Although many expressions in the Bible can be wrested, and have abundantly been wrested, by men to an opposite sense, still the totality of its teaching unquestionably represents God to be a Being of universal and unchangeable love. Indeed, this is taught and exhibited in the Bible in such a remarkable manner, that the mass of Christians, in contemplating these teachings and this exhibition, even while they strive to confine infinite love within the limits of their comprehension, and while they cloud it by imputing to God the vindictiveness of their own dispositions, are still habituated to overlook, for the most part, the harmonious exhibitions of the same love by which they are surrounded. The beauty and the glory of the divine love, as revealed in the Bible, render them in a large degree blind to the necessarily equal beauty and glory of the same love, as revealed in nature.

The foregoing points of agreement may be summed up in the pregnant statement, that the revelation of God made in the Bible is in every respect fully adequate to the revelation of Him that is made in His works. In these respects the Bible stands alone, in striking contrast with all other recorded thought. No other composition meets any of these demands, except so far as such compositions have obviously been derived from the Bible itself.

It is next to be noted that, although the Bible was completed long before the beginning of scientific inquiry, still the discoveries of science have not rendered it obsolete. On the contrary, these discoveries have enabled the meaning and force of much of its language to be better understood. It is hardly possible at the present day to conceive the ignorance of physical truth, or the false conceptions

respecting physical phenomena, or the limited range of thought concerning all this class of subjects, that existed universally during all the period in which the several books of the Bible were written. The form of the earth had not even become a subject of inquiry. Respecting its size, curiosity did not anywhere extend beyond the small portion of it that was known. Its age was supposed, by the few who had any thought about it, to be measured by a few generations of men. The speculations of Pythagoras were, apparently, without appreciable influence, and aside from these, the only conception respecting the earth that was held with any degree of distinctness was, that it formed the centre of all things, and that a solid firmament, in which the sun and moon and stars were set, revolved around it every day. The whole Bible was written under these infantile conditions, of mistaken conceptions, and extreme limitation of thought.

Since that time, on the one hand we have learned the obscure rank of the earth, and, on the other hand, the thoughts of men have become enlarged, until human conceptions are lost in the infinities of space and time. But we have not outgrown the Bible. There appears to be a remarkable likeness between this Book and the nature of things, in this respect : The meaning that is conveyed to our minds by the Bible, in all its allusions to physical objects or phenomena, expands just in the degree in which our conceptions of the phenomena expand. It seems as if both the description and the phenomena were limited to us in the same way, namely, by our capacity to comprehend them. The unique character of the language of the Bible in this respect also becomes strikingly evident, when this Book is contrasted with any other writing.

In addition to this remarkable character of its language, it is to be observed that the Bible contains only one distinct trace of the ignorance of the ages in which it was written respecting physical phenomena. This is the account of the sun and moon standing still at the command of Joshua. A candid examination of this account can leave no doubt that it ought to be regarded as a fable. There seems, however, little hope that this will be done by any Christian organization, at least at present ; since the

Protestant Church, which could see the revisers of the English version of the New Testament make short work with the legend of the angel of the pool, appears, equally with the Roman Church, to have set its heart on this equal or greater absurdity.

Accounts of miracles are not by any means to be rejected. On the contrary, when the Bible is seen to be of divine origin, then it must be regarded in two aspects, first, as the revelation to man of divine truth, and, second, as the account of the discipline, by means of which men were made capable of receiving this revelation. Now it cannot fairly be questioned, that in both these respects miracles had their necessary use. No one can affirm, that miracles could have been dispensed with, in the divine plan of imparting to the human race that truth, the apprehension and practical reception of which by man involved no less than a radical and complete change of his nature. It will be observed that all miracles were of a character adapted to one or the other, or to both, of these two offices. They served to impress the revelation of spiritual truth upon the minds of men, and they constituted, at first, a chief means of the education, that has gradually, though as yet only partially, been enabling men to receive this revelation. The greatest of all miracles was involved in the very nature of the revelation itself.

Thus the antecedent probability is wholly in favor of the truth of the miracles recorded in the Bible. We, therefore, readily yield our assent to the overwhelming evidence presented in support of all the most important of these; while belief in others, not so amply witnessed, but having the same general character and tendency, is also accorded without hesitation. In their abnormal condition, men could not see the infinite manifestations of the divine presence and goodness, in the midst of which they live and move and have their being. So, for these great purposes, manifestations of this presence and goodness were given to them which they could see. This seems to be the reasonable philosophy of miracles.

But the account that we are now considering has no characteristic of a miracle. On the contrary, it presents a strong contrast to all miracles in this vital respect. It in-

volves an inconceivable waste of energy, a disproportion of means to end that language has no power to express. Now, the direct opposite of this is the uniform characteristic of miracles, and if it were not so no observer of the action of God in nature could recognize them as having been performed by Him. In no miracle is there ever shown the least prodigality. We may admit that God could be wasteful, but He never is. Waste is at variance with the uniform conduct of God in nature. In miracles results are often, and indeed generally made to follow from causes that to us seem *insufficient;* but the contrary, never.

In this account, however, the earth is in effect said to have been arrested in its revolution about a whole day, in order that Israelites might be able to pursue their enemies, the Amorites, and to have been put in motion again after the slaughter of them was ended. Not only so, but, moreover, all this is related to have been done by a God who could have destroyed the Amorites with a breath, and after His actual destruction of them by hail-stones had been completed.

The Roman Church denounced the Copernican theory, and compelled Galileo, whether by torture or by threat of torture is unknown and is immaterial, to abjure this heresy ; because this theory rendered necessary the cessation of the motion of the earth on its axis, in order that the sun should have stood still upon Gibeon, and the moon in the valley of Ajalon. The truth of the Copernican theory has been established. The impossibility of supposing the motion of the earth to have been arrested is confessed by everybody. Theologians now suppose that the assumed miracle consisted in the appearances and effect with respect to light, of the sun and moon standing still. This certainly proves one thing, namely, that scientific men do not have a monopoly of absurd suppositions in support of pet theories. This supposition does not help the matter much. It involves two things, namely, the putting out of the appearances of the sun and moon where they were, and creating those appearances where they were not. Now, it is not possible for any mind that is able to form the least conception of what this account involves, in any

way in which it can be regarded, to believe in its truth for an instant.

All solicitude on this subject ought, however, to be removed from the minds of believers in the divine authority of the Bible, by the remarkable declaration that is contained in this account itself. The account contains this sentence: "Is not this written in the book of Jasher?" Theologians generally overlook this sentence. In their eagerness to believe in the account, as a statement of what really took place, they discuss it as if no such sentence was contained in it. Yet there it stands. And it solves the problem. It removes all difficulty. The book of Jasher is directly appealed to as the authority for the statement. What was the book of Jasher? The Bible contains one other allusion to this book, and beyond these two references we do not know anything about it. Four hundred years after this event David lamented over Saul and Jonathan. Preceding the record of this lamentation a verse is introduced relating that he bade them teach the children of Judah the use of the bow, and adding, in striking similarity to the sentence now under consideration, "Behold, it is written in the book of Jasher." These two sentences are all that we know about this book. But they are enough. They declare, so clearly, "that he may run that readeth it," that this story did not form any part of the contemporaneous record of the event, but that it was a fable interpolated into the account certainly more than four hundred years afterwards.

No reference to this supposed miracle is found in the New Testament. The absence of any allusion to it in the Psalms is itself almost conclusive evidence that this remarkably sublime description could not have existed when they were composed. The Old Testament contains two allusions to it—one, quite vague, in Isaiah, and one more definite in Habakkuk. But these prophets lived from 350 to 450 years after David.

The interpolation of this fable into the original record is not only declared, it is also obvious on a careful reading of the passage. The narrative of the event is clearly finished before this story is introduced. Immediately preceding it we read the statement of the actual

divine interposition, and of the overthrow and destruction of the Amorites by hailstones. This recital is evidently concluded, with the general summing up, "they were more which died with hailstones than they whom the children of Israel slew with the sword." Clearly this conclusion could not have been arrived at until the final results had been ascertained. After this, and in a manner completely disconnected, this fable is introduced, with the declaration of its origin. If the three verses that contain it be omitted, the account stands continuous and complete.

It has seemed important to present what appears to be the clear truth of this matter, because the impossibility of accepting this account as anything but a fable, coupled, as it is, with the general refusal of theologians to admit any distinction between it and authentic accounts of miracles, produces a very bad effect indeed. These two things together operate strongly to lead multitudes of sincere minds to reject all accounts of miracles, and thus all belief in the inspiration of the Bible. Theologians who have seen the truth in this matter clearly enough have not deemed it judicious to declare it. No greater mistake, in this age of stubborn inquiry, could possibly be made. Moreover, in any candid consideration of the question of the inspired truth ot the Bible, the correct presentation of this prominent matter is a clear duty, and is not to be evaded. It should, however, be noted, that the real occasion for surprise is, not that one such trace of the ignorance of the age, and of its disposition to endow with supernatural powers the heroes of its remote past, should have found its way into this record, but rather that this should be the only one. The fact that the Bible is not crowded with these fables, as other accounts of heroic ages are, is one that seems to admit of only a single explanation.

It is to be observed, that in the Bible the subject of physical phenomena is not avoided, but on the contrary, and especially in the poetical portions, these phenomena are frequently dwelt upon, and that in language that is correct, and is of a character always so elevated, and often so sublime, as to stand in marked contrast with all other

compositions, even to the present day. I wish here to revert to the fact, and to dwell more particularly upon it, that the discoveries of science, and the consequent enlargement of the conceptions and comprehension of men, have been required, before the real meaning and force of much of this language in the Bible could, in any proper degree, be apprehended. Science thus compels us to declare respecting much of the language of the Bible, that it could not have had its real origin in the minds of men

The fact is one that commands our attention, that the most exalted intellect can find no language so fit as that of the Bible, in which to express the emotions that are kindled by the contemplation of these overwhelming physical truths. This language has been found uniformly consistent with, and expressive of, the highest conceptions that men can form, respecting the physical creation, as well as respecting God as its Creator, and, in each of these respects, to be beyond all measure above that of any other composition.

There is yet a deeper reason for the satisfaction that is derived from the language of the Bible, in its references to physical phenomena. The Bible is the only book in which these phenomena are referred directly to God, and are described as being His personal acts. All other books are written in phenomenal language. Apparently they must be so. We seem to be shut up to the philosophy of appearances, and to be under the necessity of describing all operations and events in nature, as if they were self-directed. We have, however, intuitive feelings that rebel against this necessity. These feelings have doubtless led to the fiction of nature and her works. The real satisfaction that is felt in reading the language of the Bible, in which God is himself presented to us as the everywhere present actor in physical phenomena, arises, undoubtedly, in a great degree, from our recognition of its truth in this respect.

The preceding observations are sufficient to render apparent the singular agreement of the Bible with physical truth, and with the revelation of God in nature. We now pass to consider another phase of the general harmony be-

tween the Bible and truth as this is taught in nature, as well as in the human conscience.

Mankind have not only progressed in knowledge since the Bible was written, they have also made an advance in humanity. The Israelites represented fully the best development of the race in this respect in their day. But they were originally a semi-barbarous and cruel people. The *lex talionis* was their unwritten law, precisely as it was among the North American Indians. Revenge was their cardinal virtue. The amelioration of this law of vengeance was one object of their great lawgiver.

It is startling to read, in the earliest writings of this people, the question recorded as asked by God himself, of the first man related to have been born into the world; a question that searches out the fundamental principles of human relations, and the meaning of which we are only now beginning to realize. Our wonder is increased when we read the command, that at the very first was given to the selfish and contentious Israelites, evidently not for themselves alone, but through them to the human race forever, "Thou shalt love thy neighbor as thyself." And in order that no place should be left for doubt as to the meaning of these words "thy neighbor," that no excuse should be found for treating them as words of limitation, the commands were added: "Love ye therefore the stranger." "The stranger that dwelleth with you shall be as one born among you, and thou shalt love him as thyself; for ye were strangers in the land of Egypt."

This command, addressed directly to the motive to all right action, the general and comprehensive command, out of which all particular commands, to govern the conduct of men in all their relations and intercourse, proceed, as necessary corollaries, was thus given to men long before they could feel or sympathize with its spirit. Many centuries were to pass before the great expounder and exemplar of this command should arise, to enforce and to illustrate it. And even then, after so long a time, how little advance in humanity had been made by men, compared with that which yet remained to be accomplished. Even since the advent of the Christ, the leaven has worked very slowly, so that it would be absurd to say that, at this

present day, the most Christian nations, as a whole, have made much progress towards the full obedience to the command, "love ye the stranger as thyself."

There remained, however, a height of spiritual beneficent activity above this, that was to be revealed by the Christ, in the further command, "Love your enemies." This is a natural command. By a natural command is meant one that is inherent in the nature of things, and which spiritual beings, in their normal state, spontaneously and necessarily obey. With natural commands of a physical nature we are familiar. These are commands to use our various senses and organs for the purposes for which each one was given us. We obey these commands in seeing, hearing, walking, and so on without end. In like manner the command to universal love is a command that the spirit in its normal condition was formed to obey, precisely as it was formed to see. Love is the response that such a spirit makes to any antagonism, whatever may be the form of its expression; or rather, it is the uniform mode of normal spiritual activity, that cannot be affected by external conditions. Obedience to this command to universal love, the expression of normal spiritual activity, was to be shown in the life and death of Him by whom the command was given. This manifestation of that nature to which this is a natural command remains an example to the human race forever.

Now every one, in the depths of his consciousness, recognizes the fact, that the command to universal love, given in the Bible, is the verbal expression of natural law. It agrees with physical law, or the uniform conduct of God, which is the manifestation of his love to all creatures alike, to the just and the unjust, to the evil and the good. The Bible alone presents this harmony. We perceive that it must have been given to men by the same Being, from whom the natural command to universal love has proceeded, and in whose conduct it is illustrated. This law needed to be declared to men. God only could declare it. Therefore the Book in which it is declared is the word of God.

We come now to a still higher test respecting the divine origin of the Bible. This has been seen to declare the true

relation existing between man and man, and to reveal the motive that in their normal spiritual state would govern the conduct of men towards their fellow men. But if the Bible be from God it must also declare the relation between man and God. Here we encounter evidence of the divine origin of the Bible that is of a singularly impressive character. We have seen that the Bible is in harmony with nature in declaring the existence of one unseen God. But it does far more than this. It declares the attributes of God, which are found, first, to be in harmony with his attributes as exhibited in nature, although men had been blind to this exhibition of them, and second, to be directly opposed to the universal and fanatical belief of the Jews themselves. He is declared to be the universal Father, infinite in love, and therefore, in the same degree which is beyond degree, in mercy and forgiveness ; and with whom every soul, throughout all the nations of the earth, has the same intimate relations. Out of these relations there springs one single natural command. To this command the Bible, if it be the word of God, must give expression. That command which man, in his normal state, would necessarily obey, as the free and spontaneous act of his rejoicing being, just as he obeys every command that grows out of his relation to the physical creation by putting forth his activity in every form for which his organs were given to him, that supreme command must also have its expression here.

We ask for it, and the answer comes : " Thou shalt love the Lord thy God, with all thy heart, and with all thy soul, and with all thy might."* We bow our heads, for we know that we are listening to the voice of the God of nature. Expressing the relation that really exists between man and his Maker, but which was never conceived of by him, as existing between himself and any deity of his own creation ; and given with a comprehensiveness and an energy of repetition that befit its transcendent consequence, and exceed that of any other form of words that ever was uttered in the ear of man, this command, that seems to ring through the earth and the heavens, could only have come from Him who had created man in His own image.

But even another test remains. What would the God

* Deut. 6: 5.

of nature, the Being of infinite and universal and changeless love, do with respect to man in his abnormal condition? Would the God that gives the sunshine and the rain leave man in the condition in which, however he reached it, he is incapable of recognizing the existence of the Being whose nature he does not share and so cannot conceive, a condition in which he feels no impulse to obey, but on the contrary feels every impulse to disobey, the command to universal love, that condition in which, to consider it merely in its negative aspect, that cannot be disputed, he is dead to all the happiness that flows from communion with infinite love? Is there any way of rescuing man from the fearful plight of a perverted nature, of making his hateful spirit lovely, that the God who cares for his physical being with such inconceivable provision could hesitate to adopt?

The crowning evidence that the Bible is the word of the God of nature is found in the answer that it makes to this question. In the supreme revelation there given of the love of God to man, in the purpose that is declared in the sacrifice on the cross, and in the change in the nature of our race, proceeding in the gradual manner that marks all the operations of God, which change we witness in its progress, obviously as the consequence of that sacrifice, and in the accomplishment of that purpose, we recognize again, beyond all possibility of doubt, the harmony between the verbal and the physical revelations of God.

It is sometimes made a ground of objection to the Bible, that it contains many mysteries. If it were a human production this would not be the case. In this feature we find another respect in which a close likeness appears between the Bible and the physical creation. Both have depths that we cannot explore. Just here we would naturally look in the Bible, if we assume it to be true, for a special likeness to nature. We observe that in nature, however little may be revealed to us, still that little is just what we need to know, and is all that we need to know. However much is hidden from us, still nothing is hidden, the knowledge of which is essential, or could contribute, to our present uses and happiness. We would expect to find the same to be the case with the Bible. This expecta-

tion will not be disappointed. All the mysteries, and these are many and deep, which are presented to us in the Bible, are for us only matters of curious speculation. All truth that is necessary to be known and received by us, that can in any way affect our present and future welfare and happiness, is set before us in clear and strong light. This fact is not affected by the disposition of men to contend about the former, and to neglect the latter because they afford no opportunity for contention.

Referring again to the remarkable character of the language of the Bible, it is to be observed, that the language which is most surely recognized by the Christian as being the very words of God is that which expresses, under so many forms, the supreme truths, of the infinite tenderness of the love of God to all men, of the personal relation that exists between the soul of man and God, and of the possible and ultimate complete unity of the human with the divine nature. As it was observed with respect to the physical descriptions and allusions in the Bible, that their meaning grows with each increase of our knowledge, and each enlargement of our conceptions, so, in an eminent degree, is it the case with the language that we are now considering. The comprehension and enjoyment of this language by us depends entirely for its degree upon the development of universal love in our souls. This language has no interest or meaning for the human spirit in its abnormal state. It grows more expressive just as the spirit becomes more responsive to infinite love. It is equal to every demand. In it every longing finds its satisfaction, and trust its complete expression.

I cannot avoid repeating, as especially applicable to this subject, the thought with which the last paper was concluded. The absurdity of any expression of opinion respecting the language of the Bible by those who can see nothing in it, and of opposing any argument whatever against the experimental knowledge of its preciousness, ought to be sufficiently obvious.

Other features of the harmony between the Bible and nature will present themselves, when we come to consider the subjects of faith and suffering and prayer. The facts already observed, however, sufficiently warrant the con-

clusion, that the Bible is in harmony with the revelations made in the physical creation, and that it supplements these revelations; that to the soul that is able to receive it, and just in the degree in which the soul is able to receive it, the Bible completes and consummates the revelation of the infinite love of God.

PERFECTION.

The purpose of the last paper was to point out some features of the agreement or harmony that exists between the Bible and the physical modes of revelation, or what may be embraced in the general expression, "the nature of things." An additional illustration of this harmony is afforded in the identical standard of conduct that is fixed by each. The fitness of mechanical science for exhibiting this harmony is also illustrated here. A common standard of conduct that transcends human experience, affords another and a very impressive proof, that the Bible has proceeded from the same Infinite Being who is manifested in the nature of things.

In mechanical science there has been revealed to man the actual standard of excellence, which is perfection. From the very nature of the case, this is the only standard that can be recognized in mechanics ; for if it be not, then where, on the the sliding scale of imperfection, shall the standard be set? This standard is, to be sure, a purely theoretical one, unattainable by man in practice. None are so deeply conscious of this, as are they whose efforts have enabled them to approach most nearly to it. The more highly educated the mechanical sense becomes, the more obvious the fact appears, that perfection is the only standard that can in reality exist. This standard admits of no compromise with imperfection. Its claims admit of no argument in their support. To the mind that is capable of perceiving them they are self-evident.

It is to be observed, also, that this standard in mechanics could not have been originated by man. Man has needed to be educated up to it, by the slow process of mechanical revelation. This bare statement would doubtless be disputed by some. It forms an important link in my argument. It is therefore necessary that its correctness shall be established. The fact is, those who would question this statement would do so only because they do not know what it means. In advance of any mechanical education,

men generally will say, honestly enough, that every one ought to aim at perfection in mechanical work. But they mean by this word something that is attainable, and often easily attainable, and with which they would be completely satisfied. They do not mean the real standard of excellence, but only their own imaginary standard, the best they can themselves form an idea of. It would be idle to talk to them about anything more exacting. They would only reply: "What do you want of anything any better than that?"

It is difficult to realize how gradually, and in what a large degree, the idea of mechanical truth has grown in the minds of men, as the result of education. I saw in practical use in the city of Oporto, a few years ago, the following method that was then employed in that city for signalling each day the hour of noon. A cannon was planted in an opening in the tower of a church. The hammer was held up by a string. As the rays of the sun appeared past an angle of the wall, they were focalized on the string by a lens and burned it in two, when the hammer fell and the gun was fired. If it were a cloudy day, or if for any reason the cannon failed to be fired within a reasonable time, it was the duty of a priest to go up the church-tower and cut the string, or make the hammer to strike by hand. I saw nothing produced in the same city that appeared to be more nearly round than the wheels of the carts, that were hewn out of planks with the axe.

Thus a consideration of what the mechanically uneducated or partially educated mind intends, when it employs the term "perfection" in a mechanical sense establishes the truth of our proposition. It is now obvious enough, that, in its real sense of absolute truth unattainable by finite endeavor, perfection is a standard that has needed to be revealed to man, and that by slow degrees.

The educated mechanic stands amazed when he beholds everywhere in nature the actual realization of this ideal perfection. This great subject can only be alluded to here. In the following paper it will be briefly considered, and a few of its inummerable lessons be presented.

One who has become familiar with the existence of this

necessary standard of mechanical excellence reads with a peculiar sensation the blazing command of the Christ: "Be ye therefore perfect, even as your Father which is in heaven is perfect." Here the same unattainable standard is set. The mere command: "Be ye therefore perfect," if it stopped there, would have left every one to set his own imaginary standard, and to be satisfied with his own at-attainment. But it would not have declared the true standard, the only real standard of conduct. This is set beyond all doubt or cavil in the added words, "even as your Father which is in heaven is perfect." We observe with gladness that this was not a new command, first uttered by the Christ, although it was given by him with more unmistakable distinctness and emphasis than it had received before; but, as in the case of the command to love our neighbor, this also had been declared of old.

Now the mind to whom the real standard of mechanical excellence has been revealed cannot fail to see, and to realize vividly, the fact, that this command to spiritual excellence was not, and could not be from man. To such a mind this command appears as the expression of the universal standard of absolute truth, in its application to spiritual beings; as the very same command that the mechanic hears respecting all his work.

An essential unity pervades all physical and spiritual existence. There is one law for both. Truth is a universal quality, not admitting of degrees, that in the nature of things is demanded in both these forms of being alike. Indeed, truth in physical expression is only the manifestation of truth previously existing in spiritual being. The degree of approach to the former is determined entirely by the degree of conformity to absolute truth that has been reached by the latter. This every engineer understands full well In the declaration of this standard of spiritual excellence, he recognizes, therefore, the voice of the giver of all being. In the command itself he recognizes a universal expression. "As your Father in heaven is perfect" is the only real standard of all excellence. This is illustrated in all the works of creation. It is revealed to man as the standard by which all his physical work is to be measured. And now in the only possible way, through

human speech, it is declared in its application to moral beings.

Thus perfection is presented to us, everywhere, and in all ways, as the essence of the divine nature, and as the law of all worthy activity, the goal of all human endeavor, both in our relations to physical and to spiritual being. As there could be no other physical standard, so there could be no other spiritual standard. But neither the one nor the other could have been originated by man. Man could not give expression to a standard of spiritual excellence, any more than he could express a standard of physical excellence, that is beyond his power to conceive. Both these must have proceeded from the same infinite source.

NATURAL RELIGION.

I have endeavored to show that the being of God is a fact, that can be revealed only as love, and can be recognized only by love; that this highest of all truths cannot be reached by inferior modes of our spiritual activity, but demands for its apprehension the exercise of the highest of all the forms of this activity. If I have been successful in this endeavor, then it will be obvious that it is a misnomer to call Natural Theology a science. This so-called science claims to be a method of demonstrating to the understanding the existence of God, by evidence drawn from His works. In other words, it is an attempt to do that which in the nature of things cannot be done. This "science" is in fact only a human contrivance, designed on wrong or imaginary principles, and therefore one which must be mischievous in its operation.

If we will imagine the children of a watchmaker, studying a watch, in order to find evidence of the existence of their father, who has been before their eyes and treating them with unspeakable tenderness all their lives, we will have the case exactly. If we will conceive that, while all this has been true respecting the father, still the children, under the influence of some strange spell, remain in ignorance of his being; that while, in helpless dependence upon him, they are carried in his bosom, and are the objects of his love and care in an inconceivable degree, still all the knowledge they can get respecting him is that he made that watch, and a great many other mechanical contrivances, we will have the sum of what can be found out about God by the method of natural theology, or by following the poet's advice, and endeavoring to "look through nature up to nature's God."

This so-called science was a natural product of the mind at a certain stage of its growth. There has been a long period during which all the relations of the soul of man to God have been regarded as being primarily the subjects of the human understanding. Our emotional nature, our

real spiritual being, has been treated by theologians with but little more regard than it has been by men of science. The highest form of our mental or spiritual activity has been neglected, and its great office, as the direct and exclusive medium for the revelation to us of the highest truth, has been ignored. The clear light of infinite truth has moreover been obscured and distorted by transmission through human media. The words of men have been substituted in place of the revelation of God, to an almost incredible extent. Prominence, in some cases almost exclusive, has been given to every form of doctrine that could be made to harmonize most nearly with the narrow and selfish and vindictive natures of men, and that could hide most effectually the infinite and universal and changeless love of God, as this love is revealed in the Bible and in nature.

The imagined omnipotent faculty of the reason has been exalted as the infallible guide to truth. Theologians have been trained to rely on severe processes of thought, and the fact that these processes led different minds to contradictory conclusions was powerless to show them the absurdity of this reliance. The religious mind was fitted into various systems of human contriving, and was fed on formulas and propositions and demonstrations and deductions, the confidence of men in which only showed the narrowness of their conceptions. Everything else was made subordinate to those questions on which men differed, and about which, therefore, they could contend.

All this naturally culminated in the supposition that the being and nature of God Himself came so far within the grasp of our comprehension, as properly to be made the subjects of human reasoning. On these points of doctrine warring views were held, and men gratified their ferocious propensities by killing each other for holding them. What rivers of blood have been caused to flow, because that men, while agreeing in the fundamental error of holding God to be the subject of human comprehension, have differed in their conclusions respecting Him!

Minds that were educated in those schools of thought could of course have no perception of the absurdity of the system of natural theology. Its deductions were of a

nature essentially similar to those to which they were accustomed. These deductions were reached by methods of the same exclusively intellectual character, as the processes of thought in the use of which they had been educated. Both arrived at the conception of a purely imaginary divinity. The living God, the God of the Bible and of nature, who can only be revealed to the spirit that loves its neighbor as itself, was equally hidden from both.

By a process quite insensible, and aided by influences which, like force, are discernible only in their effects, the mind of the more advanced portions of our race has for a long time been outgrowing this infantile stage. The true nature of religion is coming to be better perceived. Harmony of the natures of individual men with the nature of God, in love, is seen, more and more distinctly, to constitute its sole essence.

The merely intellectual nature, with its beliefs about what is utterly beyond its comprehension, is being dethroned from its usurped supremacy; and the emotional nature, and the conduct as determined by the affections, are coming to be accorded their rightful place.

The real progress of civilization and Christianization, which in their essence are one and the same thing, is seen in the greater relative importance that men attach to those deeper verities about which it is not possible for them to contend.

Under these changing conditions of religious life, it is not at all a matter of surprise that the methods and the deductions of natural theology should, at the present day, receive far less attention than they once commanded. Their unsatisfactory nature is, in fact, very generally felt, even by those to whom this science has been carefully taught. This is a cheering indication. It is, indeed, high time that natural theology, that seeks in nature for evidences of the being of God, whom the soul has not "spiritually discerned," should give place to *natural religion*, that in everything in nature recognizes with adoration the active manifestation of that love which has been revealed through its likeness to the image formed in the spirit; that sees exhibited all about it, in an infinite degree, the universal love that it feels. It is high time

that the works of God should be studied again in the spirit of the Psalms. The disposition of religious thought, that even yet prevails under the benumbing influence of our scientific education, to regard with little concern the mighty religious influences by which we are in fact enveloped, is matter for profound astonishment.

When God has been revealed within the spirit, in the only possible way, by the recognition of love, and is then seen to fill the universe with his presence; when the glad soul, in its freedom, finds itself a participant in the harmony of the creation, in which nothing exists for itself, but all things are in ceaseless activity for beneficent purposes; then, indeed, the study of the love of God in its physical manifestations, so far as our limited powers enable us to pursue it, becomes unquestionably the most satisfactory of all mental occupations.

In this study we are not seeking after evidences of the being of God. Far from it. The spirit has already found rest and peace in the certain recognition of this supreme truth. No question respecting the being of God can disturb it, or can even enter its consciousness. But the spirit delights to come more consciously into the presence of God, to see his glory revealed to it, so far as it can endure the sight, and, while lost in wonder at the wisdom and the skill that his works display, to adore the love which it beholds animating and directing the whole. In this study we admire, also, the evidence that God has created us in His own image. He has given to us the intelligence by which we are, in some degree, however small, able to understand the divine methods of operation, and ourselves, though at so great a distance, to employ similar methods, and to exercise similar skill. This is a fact which affords corroborative evidence of the strongest character in support of the truth of the perception of all spiritual realities by recognition. To this evidence attention will shortly be invited.

Although, in any proper view of the works of God, the wisdom and skill which these works display are obscured by the brighter light of the Divine love, or, to drop the figure, although the former can have little of real interest for us, except in the degree in which the latter is revealed,

and then the beneficent purpose manifest in everything must occupy the supreme place in the thought, still it will conduce to clearness of apprehension, if we separate these in our mind for a little time, and observe the former alone, so far as possible without regard to the omnipresent motive.

We have been so constituted that, when once the Infinite Mind has been recognized, we then perceive intuitively that the creation must have emanated from that mind, and must be the manifestation or expression of it. The philosophy of this perception is very simple. We reason from ourselves. We observe our own process of mechanical construction. In a subordinate sense, man is himself a creator. His creation has a uniform order, from which no variation is conceivable. That order is this: First, he forms in his mind the idea. This mental conception is for him a real spiritual entity, which he beholds in his "mind's eye" as distinctly, as though it were sensible to his touch. Afterwards he produces its material counterpart, which cannot vary from the original in his thought, "even by the estimation of a hair." The thought grows or changes in his mind. Corresponding development or change is demanded in the visible duplicate or representation of it. When completed, his work stands before him merely as his embodied thought. Whatever the nature of his creation may be, and whether it be simple or complicated in any degree, in all cases alike the form, the adaptation to its use, the function of every part, the relations of the several parts to each other, all these together, constitute the material realization of his idea, the expression of his purpose, the visible representation of his thoughts, of his whole spiritual nature, so far as the work affords opportunity for such representation to be made. Thus in our own creative work we find that all possibility of material existence is determined and limited by the pre-existent thought and purpose in our minds. This uniform order of creation is familiar in all our experience. We cannot conceive of any other. Analogy compels us, from this uniform experience, to draw the univeral conclusion: First in the order of being must be a mind. In this mind the thought must be perfected.

Afterwards only can material existence come to be, as the embodiment of such thought.

This uniform order of creation is to be observed in everything. The voice cannot even produce a tone, until this tone has been formed in the mind, and has been heard by the mental ear; and just as this mental tone is true or untrue, firm or uncertain, so precisely will its audible counterpart be. But this order finds its most complete illustration in the endlessly varied applications of mechanical science to the uses of man. These applications constitute one of the distinguishing glories of civilization. Since everything in nature has more than a single use, and often multiplied uses for the same thing are known to us, it is a reasonable supposition that mechanical science has also its uses, beyond and above all these material applications. A leading object of these papers has been to trace some of these spiritual uses. We now find ourselves face to face with another and an important one. Mechanical science exhibits the whole philosophy of the perception of spiritual realities by recognition. It shows how it is possible for us to have any realities, that are not of a nature to be revealed to us through our physical organs merely, placed before our very eyes continually, obvious to those who can recognize them by their resemblance to images already formed in their consciousness, but absolutely hidden from those who can form no such recognition, and also beyond the power of words to convey the knowledge of them, except so far as the words can revive in consciousness images that had been previously formed.

In a moving machine the uninstructed mind sees parts in motion merely, and this is all that it can see. The mechanically instructed mind, on the contrary, in a degree precisely proportionate to the depth of its own insight, sees that which produces and determines every motion, and the object and effect of every motion, and the forces, static and dynamic, that are exerted, or that are developed, in every part of the machine, to produce or to resist motion. This perception varies with each individual, and no finite mind ever possessed that complete insight that would enable it to recognize every force that is exerted in even the most simple moving machine.

Thus we find it to be the case respecting force, in these various modes of its manifestation, that if images corresponding sufficiently to these modes of manifestation have not already been formed in our consciousness, then we cannot recognize these manifestations of force, we are dead to their existence. But if these are already familiar objects to us, then we look within the material forms, and recognize their presence.

So, if we were not ourselves capable of mechanical construction, we could not recognize mechanical construction in the works of God. If we possessed no mechanical skill ourselves, mechanical skill in the universe would be shown to us in vain. All things would possess no more significance for us than the cuneiform inscriptions do. We would see only shapes that had no meaning. These shapes become informed for us with thoughts, only because we ourselves can inform material shapes with thoughts.

It is also to be observed that if this likeness exists in our consciousness, we *must* recognize it. If our own consciousness furnishes an analogous reality, then the manifestation of the constructive thought, purpose and skill cannot be presented to us without instant recognition. We at once look within the material form, and behold the spiritual reality that is manifested.

Thus mechanical science gives us the key to all spiritual perception. Beyond mere material forms, we see without only that which we recognize, because the same thing already exists within ourselves. If we are ourselves skilled workmen, and nothing else, then we can see in the physical universe only the skilled workman. If we are chemists and nothing more, creation is for us the universal laboratory of the infinite chemist. If we are merely mathematicians, we can form no conception associated with anything that we see except a mathematical conception. So far as they go, these conceptions would all be correct. The fault with them is that they are only partial and subordinate conceptions. But every moral being is capable of something more than being a skilled workman, or a chemist, or a mathematician. He is capable, also, of the feeling of love in endless degree of development, and of perceiving the fact, that this feeling of love is the sole

foundation of all worthy character and conduct. Just in the degree that this feeling exists, by the same necessity, the universe is seen to be animated by love. This is God, and thus only through the necessary recognition of love, can he be revealed to man.

A little incident, that became invested with both a sweet and a mournful interest, will help us to see more clearly the line between the revelation of God and the deductions of natural theology. In the summer of 1882, travelling one evening on the steamboat *Bristol*, I spent a few minutes in looking through the window in the saloon at the engine, While thus occupied, I heard an exclamation of delight near me, and turning I saw a girl of 17 or 18 years, attended by a gentleman, and gazing with rapture on the ponderous machinery. I was instantly arrested by her appearance, and thought I had never seen so spiritual an expression. Her face was luminous, and riveted my sight. After watching the movements of the great engine in silence for some time, she slowly exclaimed, as if to herself, unconscious of any other presence, "only to think of the *mind*—that could plan all that!" The next morning I read in a Boston journal the telegraphic announcement of the death of Erastus W. Smith, the designer of the engines of the *Bristol*, and so the last one of the long line of discoverers and inventors and designers, whose minds had successively helped to "plan all that."

Here the intelligence of this remarkable young person had penetrated to, and her whole thought was absorbed by, the only spirituality that the case could present to her, and that was, the mind that could plan what was to her so wonderful. A mechanical expert would, of course, see much more than this. In a degree corresponding with the degree of his own skill and experience, he would see the functions of the various parts of the mechanism, and the adaptation of each part to its purpose. He would perceive the operations that must go on out of sight, in order that visible action should take place. Each of these things, and many others, would be recognized by the expert, just so far as corresponding images had previously been formed in his mind.

All this was, of course, entirely beyond the girl's per-

ception. She had never had formed in her consciousness images that would enable her to recognize any of these features. She had only a vague and wondering idea of the intelligence that would enable a mind to "plan all that." About this mind two things are to be noted: First, the conclusion is not warranted that it could do anything else except this. Probably it could not do any other thing so well. Second, the perception of this mind does not suggest the idea of any personal relation whatever between it and the admirer of its work. No thought or feeling arises of love or faith or worship. The suggestion of such sentiments is seen to be utterly incongruous.

This illustrates the failure of natural theology, and reveals its cause. This miscalled science employs a wrong method, or rather it *is* a wrong method. It is as if a man should begin at the top to build a house. The method of natural theology is utterly powerless to create in the spirit the activity of universal love. It can therefore give to us no perception of God, the being animated by infinite love, and with whom we have personal relations. The Bible teaches us that the activity of universal love, that form of our spiritual activity by which we are able to recognize God, is a divine gift. Natural theology, on the contrary, assumes that without the employment of this gift, the knowledge of God can be attained by a process of reasoning. It is a human method taught by men, in opposition to the divine method.

I have insensibly been led back to the further discussion of natural theology; but will now endeavor to adhere to the especial line of observations that I have proposed, and to present in a brief form a few illustrations of the wisdom and skill that fill the universe.

When God has been revealed in the spirit, then it is true that all education is a help, and a very great help, to the recognition of his presence. There are two observations of a general nature, that are calculated to make an especially deep impression on the mind of the engineer, on account of the education that he has received. The first of these observations is—creation without a mistake! This great fact cannot arrest the attention of others in the same degree. Indeed the mass of mankind are inclined

rather to pass it idly by, as a thing of course. But the engineer becomes acquainted with the slow and painful growth of mechanical thoughts in finite minds. He is familiar with the constant mistakes that mark the progress of every mechanical invention from its rude inception to its successful use. He knows moreover that perfection is never reached by man; that the detection of defects in any human work is only a question of depth of insight. He is aware that, while any single mind always finds its resources exhausted, and for that reason can often see nothing wanting in its work, still improvements perpetually suggest themselves to fresh explorers. Words cannot convey an idea of the indescribable sensation of awe with which such a mind contemplates the perfection that it sees exhibited throughout the mechanism of the creation.

The second of these observations is this : In human mechanical constructions simplicity is found to be a prime necessity. This feature is the constant aim of every successful designer. Moreover, when the parts of any machine are numerous, the disposition of them, so that they may operate without interfering with each other, is always a serious problem, and often it is one involving grave difficulties. Now, when a mind familiar with this experience contemplates what appears to it as the appalling complications which are necessarily involved in all the structural works of the Creator, complications which, commencing with the disposition and movements of the heavenly bodies, extend throughout all being, and seem greatest of all in the structure of the most minute organisms, and when he beholds everywhere perfect harmony of structure and of operation, he cannot fail again to be impressed by the sight in a degree that is not possible in another mind not possessed of the same practical knowledge. He sees that in the works of God it is not necessary to sacrifice anything to simplicity. While in each individual organization the number and the variety of functions to be performed seem endless, the most direct means for performing each one are always provided, nothing is wanting that is required for any use, and nothing is found to exist except for a use, and, however

massed together, every member of each separate system performs its functions without interference from any others.

Although observations on this subject that are possible here must be very superficial, since a lifetime may be devoted to the study of a single organism, and even to a single member or feature of an organism, still, even upon such a general view, we cannot fail everywhere to behold infinite intelligence in its omnipresent activity.

A few illustrations will be given, drawn from the circulations in nature, which may leave on our minds a deeper impression of the harmony that everywhere prevails, as this is especially seen, first, in the adaptation of each thing to varied uses, and, second, in the coöperation of various agencies for the accomplishment of a single purpose.

The first one of these illustrations will be found in

THE CIRCULATION OF WATER.

Water presents the only form or combination of matter in the fluid state that can support either vegetable or animal life. The structure of every organism is adapted to receive it, and every one is dependent upon it. Every animal and every vegetable must drink or perish. The presence and purity of this universal necessity are secured by a continuous circulation, in which water, rising in an invisible state from the whole surface of the earth, is borne in the air, either in this state or in the form of clouds, until, under certain unknown conditions, it is returned to the earth in rain or snow.

For the existence of water we are indebted to the pressure of the atmosphere. If this were without weight there could be no organic being. Organic being is dependent upon water, and water exists in a fluid state only under pressure. Under the pressure of the atmosphere, and at ordinary temperatures, water passes gradually into the gaseous state. As the vapor that is formed by this evaporation becomes cooled in the upper regions of the atmosphere, a portion of it is condensed and forms clouds. Here phenomena appear which science has not yet attempted to explain.

By this condensation minute drops of water are formed.

There is no intermediate state of this substance between fluid water and the invisible elastic gas known as vapor or steam. Clouds differ from lakes only in the minute subdivision and separation of the particles of the water that composes them. At the ordinary mean elevation of clouds each one of the drops of water of which they consist is about one thousand times heavier than the air that it displaces, and yet it does not fall, not even when frozen, which is very often the case. By some means, also, the particles of water in a cloud are kept at a uniform distance from each other. When, under some unknown change of conditions, these become united in larger drops, the water descends to the earth to perform its innumerable functions.

Concerning the nature of the forces which operate to determine the size of the minute particles of water that are formed by the condensation of a portion of the uniformly diffused vapor, which keep those particles at a distance from each other, and which prevent them from falling directly to the earth—the forces to the action of which we are indebted for the formation of clouds—we are as yet ignorant. We are in equal ignorance, also, of the forces which determine the varied forms and dispositions of the clouds themselves. No plausible theory even, of a definite nature, has been advanced respecting the causes of any of these phenomena.

Rising from the earth purified and invisible, revealing itself in the heavens in forms of beauty, and thence descending to renew all life, water presents to us a perpetual symbol.

A general survey of some of the functions that water performs and has performed, will show the important part that was allotted to this familiar fluid in the scheme of the world. By its means the earth has been made habitable. Infinite pains have been taken to transform the original chaos of jagged igneous rocks, broken and heaped by contraction and protrusion, into the beautiful world on which we dwell; and water has been the medium, or the essential agent employed in doing the whole work. The extent of this work, and the time during which it has been in progress, are shown in the facts, that, with the

exception of occasional ejected masses, there remains no original igneous rock on the surface of the earth, and the strata of formations that have been effected through the agency of water reaches to the known depth of twenty miles. Water has carried in suspension, or has contained in solution, has separated and pulverized by its motion, and has compacted by its pressure, this entire mass of the crust of the earth. It has been essential also to every combining and cementing and crystallizing process. Moreover, the alluvium in all its forms, gravel, clay, loam and sand, desert and fertile ground alike, is the effect of the action of water.

Water dissolves out of the soil all mineral substances that are required in the formation of plants. In this state of solution these substances are absorbed by the roots of plants, and are conducted upward to their leaves, there to enter into the combination with carbon, by which the earth becomes clothed with the varied forms of vegetable life. This union of mineral substances in solution with carbon forms the chemical basis of all organic being, of which being in all its forms, both vegetable and animal, water constitutes also by far the larger part.

As water is the medium employed by the Infinite Intelligence by which nearly all chemical and physical changes on the earth have been and are now being made, so also we find it to be the medium given to man, to be employed by him, in both its fluid and its gaseous states, for the conversion of heat into every form of useful energy.

The ministry of water never ceases. Its change of state is only a change of use. When mingled with the atmosphere as an invisible vapor it has a new service allotted to it. Now it wraps the earth with a protecting mantle, to prevent the too rapid loss, by radiation into space, of the heat received from the sun. The value of this service is shown by the condition of lofty mountains, where the action of the aqueous vapor in preventing this loss of heat becomes less efficient. The mountain tops are covered with eternal snow, in spite of the fact that the heat received by them from the sun is far greater than the amount that is able to penetrate the invisible envelope and reach to the level of the sea. This action of water affords

a striking example of the general truth, of which fresh illustrations reward investigation in every department of physics, that Infinite Wisdom has anticipated and provided for every requirement.

Our second illustration is afforded by

The Circulation of Carbon.

After water, carbon forms one of the principal constituents of both vegetable and animal organisms. Its circulation, which involves the ceaseless destruction and renewal of physical life, is crowded with activities, of which only the more general features come within the range of our observation.

Carbon is not soluble in any known substance. It exists separately only in the solid state From this it passes directly, without intermediate fluidity, into the gaseous state, by combining with oxygen, from which it has not yet been disassociated so as to be obtained as a separate gas. Carbonic acid gas, the familiar compound thus formed, is diffused in a minute proportion throughout the atmosphere, forming one-twenty-fifth of one per cent. of its volume, and from this source the vegetable kingdom, and thence the animal kingdom also, derives its entire supply of carbon. The leaves of plants alone, under the influence of light, have power to break the attractive bond by which carbon is united with oxygen.

We witness here a phenomenon of a wonderful character, but which is only a type of a class of phenomena that are to be observed universally. This is the coöperative action of separate and remote agencies, for the accomplishment of a single end or purpose. In the leaves of plants, as already stated, the two constituents of their being meet. These are mineral substances, brought by water from the soil, and carbon, borne in the air. Other remarkable features are also to be noted. If carbon were soluble in water, or if mineral substances were not so, in either case, the vegetable and animal creations, as these are constituted, could not exist. It is only in the leaves of plants that sunlight exerts any influence to dissociate carbon from its union with oxygen.

In some of its vegetable combinations, carbon is made adapted to the nutritive organs of animals, and being received by them in these forms, it becomes, next after water and its elements, the chief constituent of the organic portions of their bodies.

From both these associations or uses, vegetable and animal, carbon returns directly to its combination with oxygen. All combustion, and all decay, of either vegetable or animal tissues, is this recombination, in rapid or in gradual progress, which is also the chief terrestrial source of heat. In animals, this return of carbon to its chemical union with oxygen goes on continually throughout the organism, and is the source of animal heat. The carbonic acid gas, which is formed in this manner, is brought by the blood from every part of the body to the lungs, and is discharged into the atmosphere at each expiration, while the blood returns charged continually with fresh oxygen, by which the process is continued.

A remarkable provision is here to be noted, by which this recombination of carbon with the oxygen of the atmosphere is rendered possible. Oxygen has an almost universal affinity for other substances, except nitrogen, the gas with which it is mingled in the atmosphere. By reason of this general and strong greediness of oxygen for combination with other forms of matter, it has resulted, that this gas forms the larger component of nearly all compound substances, both in their solid and fluid, as well as their gaseous states. Oxygen combines with hydrogen to form water, and it combines with various bases to form all the rocks and clays of the globe. All these combinations are of a permanent character. In the first one the two gases assume the liquid state under the ordinary conditions of heat and pressure. In all the combinations of the second class, oxygen becomes a solid. In contrast with all others of its almost universal combinations, stands the case of the union of oxygen with carbon. Here oxygen retains its gaseous form, and the solid carbon becomes a gas. This exceptional action brings carbon into a state in which it is adapted to re-commence its endless circuit, in the development of plant-life. Sufficient evidence is afforded here of a special purpose, in establish-

ing the peculiar nature of the combination of oxygen with carbon. This is, however, only a prominent illustration of an innumerable number of cases, in which special provision is obviously made for special uses. The cases in which the special purpose is evident to us are so numerous, that we are warranted in the important conclusion, that a special purpose determines every combination or association of matter.

But we have been led away from what is perhaps the most remakable feature of the case. Not only does oxygen retain its gaseous form, and the solid carbon become a gas in this combination, but in order that this shall take place at all, there must be precisely what is found to exist, namely, a complete want of affinity of oxygen for nitrogen. There is no chemical bond or attraction between these constituents of the atmosphere that would need to be broken, before the union of oxygen with carbon could take place. Nitrogen acts, however, as a diluent, and prevents the too rapid union of these two gases. It thus renders a most important service. The affinity of oxygen for carbon is so strong, that, were the oxygen undiluted by nitrogen, their union would be destructive of life in all its forms. These examples illustrate the dependence of all physical being, and of the various effects that are obviously intended in nature, upon the presence of matter, in precisely the states and forms and proportions that are observed, and upon the possession by each separate form of matter of the precise qualities that it is seen to have. The sincere mind cannot contemplate without emotion the perfect adaptation to its office of each one of the innumerable agencies, on whose harmonious activity all physical being depends.

Our third illustration will be drawn from

THE CIRCULATION OF THE BLOOD IN ANIMALS.

This has a peculiar interest, because it shows a remarkable provision for avoiding mechanical difficulties.

There are two features of the circulation of the blood, which, until quite recently, have escaped the attention of physiologists. If in the provision for animal existence,

these had also escaped the attention of the Creator, the animal creation would have been a failure, the mechanism would not have worked.

Since the discovery of the circulation of the blood, it has until within a few years been supposed or assumed that the flow of the blood, through the channels provided for it was produced entirely by the action of the heart. It was obvious that this powerful muscle acts as a pump, first by its expansion, admitting the blood into its cavities, and then, by its contraction, impelling it through the arteries, capillaries and veins. With this evident action investigators were for a long time satisfied, and inquired no further. This action, however, considered as the only action that takes place, involves two difficulties that did not suggest themselves, until they were made apparent by the analogies that are afforded in mechanical experience.

The first of these difficulties is found in the hydrostatic column. In any system of pipes filled with water, either at rest or in motion, the pressure of water at the base is greater than it is at a line six feet above the base, by two and five-eighth pounds on each square inch of area. Blood being about six per cent. heavier than water, if its circulation were produced by the action of the heart alone, a difference, amounting, on the average of individuals, to about two pounds on the square inch, would exist between the pressures of blood in the head and in the feet, when the body was in the erect position, and this difference would disappear on lying down. Now we know that, in fact, no such difference exists. Under normal or healthy conditions, the pressure of the blood is uniform throughout our bodies, and is unaffected by change of position. In some way this difficulty has been completely avoided.

The second difficulty is of a nature, if possible, still more serious. It consists in the disposition of fluids in motion to take the shortest road. This is a very obstinate disposition. In the experience of men with their own constructions, it has been found invariably, that, when alternative passages between two points are provided for a fluid, a very little difference in the length or the directness of these passages is sufficient to cause the fluid to choose the shorter or more direct route, passing entirely

through this channel, and standing quite motionless in the other.

Now in this respect the different routes that are traversed by the blood present extreme contrasts. Through some of the arteries and veins the communication. from the side of the heart from which the blood is discharged, around to the opposite side, at which it re-enters it, is short and comparatively direct, while through others it is many times longer and more tortuous. But the hydraulic engineer beholds with wonder the fact, that the current of the blood flows through all these alike. The action of the blood, in conveying nutriment to the most remote parts of the body, and bringing away the effete matter from them, is precisely as efficient as it is in those parts that lie nearest to the heart. By some means this difficulty also has been surmounted. How have these two results, which are impossible with man, been effected?

Among recent discoveries in animal physiology is the following important one, which affords the principal answer to this question. The powerful contractile action of the heart is the commencement of a muscular contractile wave, that passes from the heart along every artery. What we feel in the pulse was long supposed to be the swelling of the artery under the pressure of the current driven along by the contraction of the heart. This supposition involved another difficulty, to which no attention was paid. The supposed swelling of the artery would involve a resistance to the passage of the blood, and there would be a consequent loss of pressure at every point, by the amount expended in overcoming this resistance. Now it is known that the pulse is not such a swelling of the artery, but is the passage of this muscular contractile wave. Each one of these waves sends before it, in each artery, a volume of blood precisely proportioned to its capacity, and independent of the distance or direction of the flow, and maintains a uniform pressure to every extremity of the body. This wonderful action affords the only conceivable solution of this complicated mechanical problem. The next remarkable feature is, that the various arteries and their branches are nicely proportioned in area to the extent of the regions which are to be supplied with blood

through them. By this careful adaptation, under the uniform wave pressure, every part of the body receives its equal nutriment, and we have symmetry of form. A muscular action, similar to the wave action in the arteries, is to be observed, impelling each swallow of water *upwards* along the neck of the horse and some other animals while drinking.

This glance at a few features, taken almost at random, and which are no more remarkable than is everything else in nature, of which many examples will suggest themselves to the intelligent reader, will be concluded with a brief reference to a few of the relations or adaptations of widely different things to each other, which are everywhere to be observed. These adaptations are so familiar, that they fail to impress us. We are liable to become as insensible to them as the ruler of the synagogue was to to the present divinity, whose presence, indeed, was not, in reality, any more manifest there than it is always and everywhere, but which was so involuntarily confessed by him when he said: "There are six days in which men ought to work, in them, therefore, come and *be healed*."

These adaptations are such as the structure of the lungs of animals, with reference to the vital interchange, by the blood, of carbonic acid gas for oxygen, that is perpetually being effected within them; as the adaptation of the eye to light, and of both the eye and light, on the one hand, to the objects that are to be revealed by their joint agency, and, on the other hand, to the spirit to whom the revelation of these objects is to be made; of the wings of birds to the air, and to the weight of the body that in each case is to be supported in it, and to their further office of impelling this body through it; and so universally the adaptation of each member of every organism, not only to its function, but also to those natural agencies which coöperate with it in the performance of that function.

An impressive instance of the adaptation of physical to spiritual being, as well as of the performance of different functions by a single agency, is seen in the case of the atmosphere. Besides being the supporter of combustion and of animal and vegetable life, and performing a variety of familiar functions, by its pressure and otherwise, the

atmosphere is the medium for the conduction of sound, or speaking correctly, for communicating the vibrations of other bodies to the ears of animals.

All matter is capable of being put into a state of vibration. The variety of these vibrations is infinite. Every one of them is communicated to the omnipresent air, which is in close contact with all bodies under pressure. The atmosphere repeats and transmits all these vibrations by corresponding pulsations. It, moreover, repeats and transmits simultaneously all different vibrations that may be communicated to it, however numerous these may be, without any one being modified or affected in any manner by the others. The ears of animals are adapted to receive and repeat, in their turn, the vibrations which are communicated to them by the atmosphere. Thus in some unknown way the mind forms the notion of sound. Sound is wholly a mental conception. The vibrations of matter are silent. The waves of the air also are as noiseless as the unbroken waves of the ocean. We have no idea how the sensation of sound is produced. Anatomy traces the most delicate and curious structure. But all observation of which we seem to be capable ends where it begins, on the silent vibrations of matter.

Through the medium of the atmosphere our spirits communicate with one another. For this purpose we employ the gift of speech. This also is produced by organs that have been designed with express reference to the atmosphere. Like every other organ of our frames, the organs of speech, to our limited understanding, appear complicated, and in much of their extent obscure. We find in them, as everywhere else, everything adapted in fact, however little we may understand it, to the accomplishment of the perfect result; which in this case is unlimited capability of expression.

Here, indeed, where the material and the spiritual connect, is something passing wonder. There is not a sentiment or feeling or emotion of the soul, existing in any degree whatever, that the voice is not adapted to express. And, what is more than this, the voice does spontaneously express it. And as the ear receives the pulsations thus communicated to the air, the listening spirit recognizes the

sentiment or feeling or emotion. Thus, all human sympathies are interchanged, soul communicating with soul, through the amazing mechanisms of the vocal organs and the ear, and the pulsations of the silent air.

In reviewing these wonders of creative skill, we have followed the conventional fashion, and have described them as if we were viewing a machine. But the spirit that has received the revelation of the ever-living God chafes under this impersonality. Through all nature it sees his presence and his activity. It knows the motive of this infinite pains. It sees the love of God, shining in every ray of light, falling in every drop of rain, smiling in every flower, ripening every grain, imparting life in every breath. Love is the unity that runs throughout and connects the endless diversity. This love is manifested in all practical ways, in all common things. From its very nature, it must be in a state of ceaseless beneficent activity, in ways adapted to every want of every creature, especially to every want of man from the very lowest up to the very highest.

It is a remarkable fact, that pricisely similar conduct, or practical manifestation of love, constitutes the test that was given by the Christ, to determine the existence of the same love in the human spirit: "I was hungry and ye gave me meat, I was thirsty and ye gave me drink." We at once recognize this conduct, in the case of man, to afford the real evidence of the existence of this love. We see it to be its necessary expression.

Here, also, is found the real solution of the painful problems of sociology. All human devices, resting on any other foundation, must come to naught. The divine provision is the simple and radical one, of universal love, as the animating spring of human, as it is of the divine, conduct. Of this love we can at present form in our consciousness only faint and distorted images. Changes will be necessary in our very habits of thought, before these images can become clear and true.

For one who is fond of observing the practical ways in which the universal love of God finds its expression, the material provision that has been made for man's activity and develepement presents an attractive field. Our whole being consists of wants. The progress of civilization is

indicated by the increase in the number, and the elevation in the character, of our wants. For the supply of those of a physical nature we are wholly dependent on the earth. But we scarcely think of this dependence. The earth abounds with resources, adapted to every want as it arises. These we appropriate to our service generally without a thought either of the dependence or the provision. A brief reference to a single one of these provisions may aid us to a partial realization of their varied and boundless nature.

If an individual, in ignorance of any reality, should endeavor to imagine what a Being of infinite knowledge and beneficence would be most likely to provide for man, in a single form of matter, everywhere distributed, that should be of the utmost general use to him, that he could put into shapes siutable for any purpose, that in weight and strength should meet the greatest variety of his requirements, that should be capable of combining with other forms of matter, and in these combinations should possess a variety of useful properties, additional to its own, that, as his civilization advanced, he should find suited to a greater and greater number of his wants, and, as his knowledge increased, he should be able to apply to a greater and greater variety of purposes, and that, in all its forms, and in the characters that it assumes by combining with other substances, should be especially adapted to aid him in applying the agencies of nature to his use, and so in promoting his own civilization, the strongest imagination could never have conceived of the reality that we possess, in IRON. No finite mind can comprehend the innumerable uses of iron, from the cultivation of the soil to the transmission of thought, nor measure its importance to the human race. But iron is only one of the multitude of provisions for our welfare, with which we are already familiar. Probably there is no form of matter without its use, or more likely its multitude of uses, very many of which we have yet to learn. In the animal frame every part has its use. We have reason to believe that the same must be the case with every form of matter in the earth itself, and that too in a higher sense, namely, in adaptation to our voluntary employment of it.

In earlier papers the physical creation has been pre-

sented as our educator in two respects. Attention has been directed to the ministries of force and of truth. Our complete dependence on the physical creation for our mental, as well as for our physical, sustenance and growth has been briefly referred to. We have admired the adaptation of all things by which we are surrounded to the development of our spiritual, as well as our physical, powers, by use and exercise. We have seen, moreover, how truth in the physical creation is adapted to promote the growth of truth in the human spirit. The latter we recognize to be a higher office than the former. The elevation of human character is an object of unspeakably greater consequence than the increase of human knowledge. The normal effect of physical influences should be that these would advance hand in hand.

Now, we have presented to us another adaptation, harmonious with these, but of a higher nature still. To bring the human spirit in its emotional nature, in its essential being, into harmony with the nature of God, is an object to which all other objects must be subordinate. These must be accounted worthy or unworthy, just as they tend to promote or to hinder this supreme result. All education has its noblest use and reason in the fact, that it fits the soul of man more intelligently and more profoundly to worship God. This supreme end, of transforming the spiritual nature of man into likeness to God, is the end that the physical creation is above all adapted, and so evidently intended, to promote. It performs this work, first, by the constant exhibition of truth, which has already been dwelt upon, and second and chiefly, by setting before mankind, perpetually, the stupendous manifestation of the infinite, the universal and the unchangable love of God.

We have observed that everywhere in nature there is to be seen the coöperation of many independent agencies, working together in harmony, for the accomplishment of every particular purpose. In the same manner precisely, we have these infinitely varied manifestations of the divine love in nature, evidently intended to coöperate, in the same perfect harmony, with the supreme manifestation of the same love, that is revealed in the Bible, for the

accomplishment of the same great purpose. It is of the greatest consequence that this harmony should be recognized. Then the sacrifice of the cross must be looked upon as the necessary expression of the same love that is shown in nature. It is seen to be precisely what we ought to look for.

The adaptation of the physical creation to its *inferior* educational uses is something that we recognize at once, and turn it to full practical account. For these purposes we give all diligence to the study of nature. We derive all possible intellectual advantage from the wonders of the creation by which we are environed. But the highest of its uses, and the one which it was obviously intended above all others to serve, we are slow to perceive. We are not eager to study the love of God in nature, and to open our souls to its transforming influence. This supreme spiritual revelation we are blind to, naturally, and this blindness has been actually darkened by our system of education.

Physical science, as at present limited, is chiefly responsible for the false education that now generally prevails. This science exercises a controlling influence on the formation of our very habits of thought, and it supplies, to a great extent, the formulas of speech that men are accustomed to employ. Its influence is mischievous. It completely disregards and ignores the principal thing. It forms its conclusions on a partial view of the facts. It admits into consciousness only that to which the mind reaches, in the inferior modes of its activity. To these things it insists upon confining the attention, as to the only things that can be known. The highest of all truths, that which at once unifies and vivifies the whole, the truth that is of so much greater consequence than those to which it limits its thought, that it were infinitely better that all those should perish out of human knowledge than that this one should be lost, to this it is dead.

It ignores, as a source of knowledge, the highest form of our spiritual activity, through which alone the revelation of the highest truth can be received. It dismisses, as undeserving of philosophic regard, the activity of love, the spring of all worthy conduct in man, and by the recognition of which only can infinite love be revealed,

which is the spring of all the conduct of God. And it exalts the reason, a fiction of its own brain, and makes the supposed conclusions of this imaginary faculty the limits of its belief.

This unspeakable foolishness is easily exposed. The philosopher says to one whom he looks down upon as an ignorant man, and who does not believe in his instruction: "My friend, what do you know about the matter? What right have you to express, or even to form, any opinion at all on the subject?" Ah! it is clear enough that the ignorant unbeliever has not had all the facts revealed to him; he cannot receive the revelation of them; they are shown to him in vain. Yet he is presuming to exercise the judicial functions of his mind on the basis of what there is in his consciousness. Of course, he is judging of matters quite beyond him, on insufficient and erroneous and imaginary data. The unbeliever is himself, however, quite unconscious of all this. He cannot see, and so he will not believe, that outside of his little horizon there can exist anything, that, if he knew it, would change all his conclusions. He insists upon the authority of what he has been taught to call his reason.

The philosopher abandons the attempt to enlighten him; sighs as he reflects upon the process through which the uneducated mind must pass before it can stand on his more elevated plane of thought; then turns away, and proceeds to do the very same thing. While taking no account of the two controlling facts, namely, the being of God and the endowment of man with a mode of spiritual activity, by the recognition of which he comes to a certain knowledge of that being, the philosopher assumes that *he* embraces within his consciousness everything required as a basis for a final judgment, and he appeals to *his* reason as the final arbiter. In the view of infinite intelligence, very little difference will appear between the knowledge of the two individuals, or their right to rely on their own judicial findings.

I remember, at a meeting of the British Association for the Advancement of Science, held at Newcastle-on-Tyne, some twenty years ago, listening to an account, given by Mr. Glaisher, of a balloon ascension that he had made for

scientific observations, with Mr. Coxwell, a noted æronaut, from a point near London. This impressive description fixed itself in my memory. Mr. Glaisher said that as they rose higher and higher, irregularities on the surface of the earth gradually disappeared; well-known elevations became more and more indistinct; until at last none of these could be recognized, but the whole landscape appeared to be on one level, and that the level of the Thames.

Science has had a surprising degree of success in rendering mankind insensible to the spiritual influences of the creation around them. Through the direction that it takes of our education, it is able actually to control our very modes of thought. It has taken care that no ideas beyond those of force and law shall enter the mind in its forming stage. This influence of science on the theological mind generally has far outweighed the effect of the contrary teaching of the Bible. As a result, pulpit instruction rarely rises above the impersonal idea, so fearfully false, of a regular constitution and order of nature, with which the Almighty only occasionally interferes. This false conception we see continually carried to the length of imagining a contrast between the God of nature and the God of grace; a contrast that certainly exists between the true God and the imaginary being to which we arrive through an intellectual process. To the infinite presence, within all the modes and forms of His manifestation, of the God to whom it makes its supplications, the pulpit is, to a large degree, practically dead. We are spiritually bound in fetters forged by men, and may sigh for the freedom of the poet's poor Indian,

> "whose untutored mind
> Sees God in clouds, and hears him in the wind."

It is believed that the lines of thought which have here been faintly traced, and that for only a short distance, lead in the direction of the truth. If this belief is well founded, then the cure for honest scientific skepticism ought to be found, by following these lines into the infinite spiritual domain towards which they tend.

The being of God must be at once the fundamental and the supreme fact of philosophy, the Alpha and the Omega,

the beginning and the end of all knowledge. As He is omnipresent in nature, so He should be present in every thought of nature. If in reality everything in nature is the expression of His love, then any conception of anything in nature to which the love of God is not fundamental must be at least an incomplete conception.

It is safe to say that, when true science makes its appearance in the world, it will not make it its great object to arrest man's thought at the point where his own being begins. Out of the infinity of relations that exist between what is called matter and man and God, it will not select the lowest of all, or the relations between different forms of matter, as the only ones to which attention is to be directed. It will not refuse to admit the highest truths into consciousness, and deduce all its conclusions from observations of the relations between matter alone.

The false philosphy, that divides the human mind into imaginary separate natures, and that imagines truth, as being of divers kinds, corresponding to one and the other of these different natures, and that rejects the emotional nature as a source of knowledge, is at the bottom of our present conventional and mistaken habits of thought. The cure, by which this condition of philosphic thought, so disastrous in its effects, is to be remedied, must therefore be of a radical character.

BEAUTY.

We are so constituted, that the appearances of the physical creation, or those manifestations of force that are observable by our senses, awaken within us pleasurable sensations or emotions. The feelings which are thus excited are various, both in kind and in degree. They differ with the different characters of the objects observed, and also, in degree especially, with the different characters of the minds observing them.

Those feelings may all be comprised under the term pleasurable; and, in a like general sense, beauty may be employed to express all the qualities, by the contemplation of which these pleasurable emotions are awakened. This general sense suits our present purpose. In this general sense beauty in nature is that quality that is recognized with a sensation of pleasure by the beautiful mind.

The first remarkable fact about beauty is its universality. This can hardly escape the notice of even the most superficial observer. In all the universe, with occasional exceptions obviously abnormal, every sight and sound is adapted to awaken in the mind some kind and degree of pleasurable emotion. From the glory of the starry heavens, and the indiscribable splendor of the sun, throughout everything that is revealed by its light, even to the most minute organism, every appearance in nature, great and small, distant and near, in sky and earth and sea, animate as well as inanimate, addresses itself, either in form, or color, or sound, or motion, or in these modes together, with a greater or lesser degree of impressiveness, to our feeling of sympathy with beauty, or, to the beautiful in our own natures.

Beauty is, moreover, endlessly varied and ever new. The variety of its expressions may, with propriety, be described as infinite. The healthy mind never becomes weary of their contemplation, but on the contrary grows more and more enamored with them. It hails every new manifes-

tation of beauty with new delight, and dwells upon every familiar one with deepening awe, or with more tender affection. Whatever the meaning of it may be, beauty is all about us, enveloping us on every side, and all our associations are with that which is adapted, in degree without end, to give to us delight.

But what is beauty? Why is it universal in nature? How comes it to be infinitely diversified and yet the same? Why is it that we derive pleasure from the sight and contemplation of it? Before these questions can be answered, we have got to disabuse our minds completely of the conventional, artificial and false education that we have received.

All progress in thought is embarrassed by the systems and contrivances of men. We are the victims of a mania for classification, by means of which all idea of the unity of truth is lost. Strong minds map out their imaginary schemes. To them and their followers these schemes stand in the place of the truth. Much of what is called education consists in the handing down of those devices from learner to learner, each generation, in turn, teaching to the next one what it has itself been taught. When originality appears, it commonly does so in a new system, more artificial than the old one. By these means, both the unity of truth and also the unity of our own spiritual being grow more obscured, and the mind seems to lose, and undoubtedly it does in some degree lose, the power to apprehend them.

Beauty presents a striking instance of this perversity. In the last century, a German professor invented the æsthetic sense. This discovery supplied a long felt want. In the division of the human mind, no place had been made for beauty. The intellectual faculties would have nothing to do with it; it could not be weighed or measured. On the other hand, ethics had no place for it; for no idea of right or wrong could be affixed to it. The intellect and the moral sense were thus defined and limited and occupied, and beauty was left out in the cold. It was obviously necessary, if mankind was to know anything about beauty, that a special faculty should be contrived for the purpose. So all men hailed this discovery of the æsthetic sense, which

was to extricate them from such a serious dilemma, just as pagans were wont to hail a new divinity. Since then, by common consent, everything pertaining to beauty has been committed to this imaginary separate faculty, just as, in the imaginations of men, the winds were once committed to the care of Eolus, and the sea to Neptune.

The idea of an æsthetic sense was a natural outgrowth of the general tendency to artificial classification. It only added another to the existing list of imaginary mental faculties. These must all be swept away together. The simple truth must be recognized, that the mind is a unit, and that what have been conceived as different faculties, are only different modes of activity of the same conscious spirit, which modes of activity are combined in various degrees in every mental operation. There is, in truth, no result or state that is reached by any mind, whether this be a perception, or a conclusion, or an emotion, that is not the effect of the coöperation of various modes of our spiritual activity, as the occasion calls for their exercise. The correct apprehension of any form of truth involves the harmonious exercise of many forms of this activity. It follows, that in order to be capable of any such apprehension, we need the symmetrical development of every potential mode of our spiritual activity. We shall find this to be true in an especial degree in the case of beauty. Instead of beauty being apprehended by us through a medium of its own, that is neither an intellectual faculty nor a moral sense, the truth is, that beauty is above all things of a nature that demands for its perception or recognition the coöperation of every form of activity of which our spirits are capable.

In the last analysis, beauty is found to be one mode of expression of the love of God. It is thus always associated with the practical expressions of the same love. Both combine to reveal the very heart of the Father. Like the love which it expresses, it exists in infinite degree. Like that love, also it is perceived by us by recognition. No mind can perceive beauty in nature in degree greater than its own. Only the perfect, or perfectly beautiful, spirit can perceive beauty in its full reality, or be capable of the perfect joy that its recognition inspires.

Descending from this contemplation of the very nature of beauty, we find it to be the manifestation of excellence. The works of God, in their normal development, are perfect. Beauty is the sign of this practical perfection. In those works the mind spontaneously and necessarily recognizes that degree of beauty that it itself possesses, or that it is capable of perceiving.

The association in nature of beauty with utility is a subject of profound interest. In nature everything has its use, or its multiplied uses. Our observation is sufficiently extensive to warrant this general conclusion. More than this, everything in nature is in a state of activity, coöperating in harmony with everything else for beneficent purposes. This also is a well established conclusion. With all this activity and with all these uses beauty is invariably and intimately associated. Indeed, this association is so uniform and so intimate, that the two appear to be identical. In nature beauty may be defined to be fitness for beneficent uses. This is a true and an instructive definition. It is in entire harmony with the one already given. It indicates the active nature of the love which beauty represents, and also the character of the mind that is in harmony with it, or by which it can be truly perceived. In the light of this relation, the comprehensive nature of beauty, and the fact that its proper apprehension calls for the exercise of all modes of our spiritual activity, in the fulness of their symmetrical development, will become obvious.

Our proposition then is, that the beauty of anything in nature consists in its fitness for practical beneficent uses. The mind that is itself in any degree fitted for such uses feels the harmony that exists between itself and such objects in nature, and they appear beautiful to it just in that degree. The spirit rejoices in the harmony that it feels.

It is customary to say that, in the harmonies of nature, fitness, so far as we have discovered it, is invariably found to be associated with beauty. This conclusion has been compelled, as the result of all observation. One step further brings us to the necessary reason of this invariable association. Both represent the same deep reality. We cannot separate them. The longer our minds dwell upon their relations, the more absolute their identity appears.

For us it is strictly true that fitness *is* beauty. It is deeply interesting to trace this identity of beauty in nature with fitness for beneficent uses, even the little way that our knowledge of such uses enables us to do.

We are able to perceive this fitness in the *forms* of natural objects to a much greater extent than in any other feature of them, and so it is especially in these forms that we perceive the identity of this fitness with beauty. For illustration, the outlines of fishes and of birds are lines of grace, their forms are beautiful, the observation of them gives us pleasure. But these are the outlines and the forms that adapt the fishes and the birds for moving most easily and most accurately through the water and the air, and which are indispensable to these purposes. Their movements are also always in graceful and pleasing lines; but the laws of force and motion do not permit these movements to be in any other lines, except those that are graceful and pleasing.

So universally, we admire the proportions and the structure of every creation in the animal and the vegetable kingdoms. Every new observation makes a fresh appeal to our admiration. The sight of every part as well as the whole of every organism gives us pleasure. In every case we are able to perceive that the form and proportions and structure that we admire are precisely those that enable each member of the organism to perform its function most perfectly. The foliage of plants, for example, is a crown of beauty. It is also the organ through which the plants breathe, where go on the wonderful combination of mineral substances with carbon, which seems to be the first stage of the vital operations that result in the growth and development of the plant. These all depend upon the extent of leaf surface that is presented to the sunlight and the air. The whole structure of every tree or plant is adapted to effect this extended exposure, and to maintain it against the force of storms.

Two things are here to be noted. First, the adaptation of animal and vegetable structure to practical beneficent uses is carried to an extreme of detail that transcends our powers of observation. Every new exploration discloses uses and adaptations to uses, that were unknown to us be-

fore, and in every case the completeness of this adaptation fills our minds with wonder. The deeper we get, also, the more we are impressed with the superficial nature of our observations. Second, the perception of the fitness of anything for its use increases its beauty in our eyes, and deepens exceedingly the pleasure with which we regard it.

We perceive that, even with respect to forms in nature, our apprehension of their fitness for their uses is extremely limited, and is for the most part confined to general features. When we pass from them to the consideration of colors, we are obliged to admit that our knowledge of their uses is very slight indeed. Still this knowledge, slight as it is, is sufficient to warrant the same general conclusion that we have been compelled to arrive at respecting forms. We cannot entertain a reasonable doubt that every color also must have its use, and that these uses are always beneficent. We are undoubtedly aided to this conclusion by the analogy that is afforded by the forms of matter, where our observation of uses and of the identity of these uses with beauty is so much more extensive. But we observe in the case of color also convincing illustrations of this fitness and this identity. For example, green is the universal general color in the vegetable clothing of the earth. It is also the color that is the most grateful to our organs of sight in their healthy state, and that exerts the most healing influence upon them when they are impaired. This adaptation, however, is probably only an incidental one. Light itself, shorn of its glory, would cease to perform its life giving functions.

We observe in nature an inconceivable number of beneficent results, that are being perpetually accomplished, although we cannot see how. Each one of those results involves the employment of a variety of means, or of concurrent activities. There must, therefore, be this multitude of uses and adaptations to uses that are hidden from us. We cannot affirm then concerning any color in nature, in any place where it appears, that it has no use. This would be absurd. On the contrary we are warranted in concluding, in fact we are compelled to the conclusion, that what is true so far as our observation extends is true universally,—that every color as well as every form in

nature has its beneficent use, and that this is why they appear beautiful in our sight.

It is to be borne in mind, that the preceding observations have been made with reference to beauty in nature. In the imitative works of man, beauty gives us pleasure through the law of association. It suggests to us that in nature with which our spirits are in harmony. Among the works of man, architecture affords some of the most convincing illustrations of the identity of beauty with fitness. Architecture is not strictly an imitative art, but is one in which in a subordinate sense man is himself a creator, but in which he is required to conform his work to the harmonies of nature. In architecture it has been invariably found, so that it has become an established canon of the art, that complete fitness of every part of a structure for its especial use, and of the whole for *its* use, when this fitness comes to be realized, is identical with beauty.

In the perception of beauty, every mode of our spiritual activity, so far as these are called into exercise, must harmonize like the strings of an instrument. It is not necessary that we should have the intellectual apprehension of the fitness of everything for its use, in order that we shall feel the sense of harmony, and regard the object as beautiful. But if in any case we do have this perception of fitness, then this perception must be satisfied, or else the object cannot appear beautiful to us.

This is a test that, of course, we are able to apply only in cases of known *unfitness* of an object for its use. Such cases cannot be found in nature. For examples of such a want of fitness, we must look to the works of men. There, indeed, unfitness in some respect or degree of a construction for its use constitutes the rule rather than the exception, and offends the mind that has been educated to perceive this unfitness. Architecture would afford many illustrations in point. We must confine ourselves to one of an obvious nature.

The office of the foundation of any building is to sustain the superstructure. This demands solidity and strength. These are the essential qualities of a foundation. All its features ought to suggest them. Whatever would detract

from its appropriate solidity and strength, or would suggest ideas inconsistent with those qualities, is out of place in a foundation. Now we have seen ornamental work introduced into a foundation, with the obvious effect of weakening it, or at least of conveying ideas inconsistent with those of solidity and strength. In a suitable place those forms might give pleasure, but here their incongruity is shocking, to the educated mind.

Machinery again, where, as in the case of architecture, man is himself the creator, affords admirable illustrations of the same truth. Here we are able to see, also, with peculiar distinctness, the necessity for harmony through all the modes of our spiritual activity, if anything is to appear beautiful to us. The illustrations of these truths that may be drawn from machinery possess an especial force and value, because here all uses lie within our comprehension, even more fully than they do in the case of architecture; and the fitness of every part of any machine, and of the latter as a whole, for its use can be determined in a more unmistakable manner. Every machine has its special use. This use was proposed by ourselves, and we have made all the adaptations of the several parts, and of the whole, of the mechanism to its accomplishment, and the degree of our success or failure is a matter of certain observation. To the instructed mechanical engineer no mechanical forms or proportions can appear beattiful, unless a good mechanical reason can be given for them. Those forms and proportions are always the most graceful and elegant that most completely fulfill mechanical requirements. We are able to see at once, that the pleasure that the builder of any machine can derive from the contemplation of his work, all the beauty that it can possess in his eyes, depends wholly upon his perception of its fitness, or of what he believes to be its fitness, for the use for which it was designed. The same is true also of any observer who has a knowledge of such uses.

Now with respect to this fitness, we are in reality always in a greater or lesser degree mistaken. Nothing perfectly fitted for its use was ever made by man. Still, especially in our own work, we cannot see all the imperfections. All will admit, however, that in machine construction, per-

fection is an ideal that men may always be striving after, but can never reach. We may, however, observe that, just in the degree that we imagine ourselves to have attained a high point of excellence in any mechanical construction, just in that degree will its forms appear beautiful to us. I was once asked by a steam engine builder, as he contemplated his own work with an expression of absolute satisfaction and delight: "Why is not that a perfect engine?" My own view was so different, that I was quite shocked by the question. This satisfaction designers always feel, so long as they do not know any better. But when afterwards, from enlarged knowledge, probably obtained by that agreeable process known as experience, we have come to see that our work is in fact, in some degree or respect, unsuitable for its purpose, all becomes changed. Now we look upon the same forms, but their beauty has vanished. The sight of them is no longer pleasing. They fail to satisfy our ideal. We can no longer pronounce them good.

Illustrations of this nature show us also that beauty is the expression of *all* excellence. All modes of our spiritual activity must harmonize in the song of beauty. Here also "good" is a word of comprehensive significance. Before we can pronounce this word over any mechanical work, whether it be our own, or that of another mind, our sense of justice must above all be satisfied. We must be conscious in our own case, and must feel assured in any other, that the highest fidelity has been exercised. No product of the labor and skill, of either ourselves or another, can appear beautiful in our sight, unless we feel that it is the very best offering that we or they had been able to bring.

Reflections of this nature render it obvious that the moral quality is fundamental in beauty, as we have seen it to be in physical truth. It is the dominant in the universal harmony. In considering the beauty manifested in all the works of God, the spirit of man in its unity, going forth in every form of its activity, must bow in admiration and wonder before that perfection, the varied forms of which are combined to constitute this beauty, and which was pronounced by the Infinite Maker himself to be very good.

We pass now from things to beings. Here a remarkable

correspondence appears. The same qualities charm us in both. We cannot distinguish between the feelings with which we regard a beautiful landscape and those with which we regard a beautiful character. We are awed alike by grandeur of scenery and by grandeur of soul. The same harmony between ourselves and our ideal is felt in each case alike. We perceive at once the duality and the unity of the creation. It is true that the false education, that would deprive the physical creation of its supreme quality in the moral element, would hide this unity from our sight. The mind that sees God in his works will, however, discover the manifestation of moral excellence to be supremely made in the landscape.

There can be no doubt that the delight with which spiritual as well as physical beauty is regarded by us proceeds from a similar recognition. But what is it that we so spontaneously recognize? What is it that, in each of these two classes of objects alike, awakens within us emotions of pleasure, proportionate to our ability to form such recognition? There must be a reason, in some quality that is common to both physical and spiritual beauty, why any created thing or being should have power to awaken these pleasing emotions in our minds, and so should appear to us beautiful. This common quality is found in fitness for beneficent uses.

The fact that in a moral being fitness for beneficent uses is the quality the recognition of which gives pleasure to us, just in the degree that we possess this fitness ourselves, is shown quite conclusively, when we consider the opposite of this fitness, or fitness for injurious and destructive purposes. The latter is the fitness in the contemplation of which the completely abnormal or depraved mind rejoices. This is the fitness with which such a mind is in harmony. This awakens sensations of pleasure in such a nature. This is what appears beautiful to it. This was the mutual fitness that caused Fagan to be regarded with admiration by his pupils in crime.

Here we have shown to us a law of our nature. We derive pleasure from seeing in others our own likeness, or our ideal. We feel a harmony existing between ourselves and that in another which represents either what

we are conscious that we are, or that which we would be. Towards this, whatever it may be, we are attracted, and are repelled from its opposite. The one is contemplated by us with delight. The other we regard with aversion.

So it is always to be observed, that it is only in the degree in which the spirit is itself beautiful, fit for beneficent uses, or in which it feels a longing to become so, that it can derive pleasure from the contemplation of either a beautiful character, or the beauties of nature. Otherwise the spirit must be in a greater or lesser degree insensible to natural loveliness, and must regard a lovely character with feelings that range from indifference, through all degrees of aversion, to hatred, according to the degree of antagonism between its own nature and the nature that it observes. The sight of perfect beauty of spirit was once seen on the earth. It aroused in malignant natures feelings that could be satisfied only by its destruction.

This law also manifests itself in another manner, which has already been dwelt upon in a previous paper. This is the strong tendency of every mind to see in others its own likeness or ideal whether this be good or bad. Whatever character may be presented to us, the image that, in advance of evidence or experience, and to a surprising degree in spite of evidence and experience, we form in our minds, and take to represent the reality, is our own conscious spiritual likeness. We thus naturally expect and assume that others will be governed in their conduct by the same motives that we knew would determine our own, that under the same circumstances they will do that, which we know that we would do ourselves.

On the one hand, the innocent, the generous, the true spontaneously regard all others as being like themselves. "To the pure, all things are pure." "I do not think," said Desdemona, "there is any such woman." It is hard to destroy this illusion, and the trust that attends it. When these are broken their loss brings grief to the spirit.

On the other hand, those who are in any respect or degree depraved see everywhere in humanity the reflection of their own natures. They believe all men to be in heart like themselves. All apparent excellence they look upon

as hyprocrisy. It is not ordinarily possible for one who is himself governed by selfish or degrading motives to believe that the conduct of any one else can be controlled by exalted and self-denying principles.

"Wisdom and goodness to the vile seem vile."

"And when Joseph's brethren saw that their father was dead, they said, Joseph will peradventure hate us, and will certainly requite us all the evil that we did unto him."

I have ventured here to return to this subject, and dwell upon it again, on account of its singular importance in this connection. It exhibits the law of all spiritual perception. It shows the manner in which we recognize all spiritual realities. Beauty is wholly spiritual. Beauty in nature is the expression of the beauty of the divine conduct. It is the expression of the beauty of the divine spirit. Our recognition of the moral quality of beauty, of its true nature, is possible only in the degree in which we are ourselves in harmony with that nature. Our ability to recognize beauty at all, to derive any degree of pleasure from its contemplation, whether in nature or in human character and conduct, depends wholly upon the fitness of our own natures for beneficent uses in the development of their lovely capabilities. We can see without only that which we feel, and that which we are, within. For the perception of beauty, whether seen in the conduct of God or in the conduct of men, whether revealing the infinite love of God, or the development of the same love in the human soul, whatsoever is just, whatsoever is pure, whatsoever is true, whatsoever is lovely, in our own natures, must coöperate in the recognition.

We now look again upon the physical creation as our educator. We behold the ministry of beauty. We get a completer sense of the great use of all the harmonious influences by which we are surrounded. We see the supreme beneficent purpose which these are adapted to promote. By all means, in coöperative and ceaseless activity, the nature of man is to be transformed. It is to be changed from all that is hateful to all that is lovely. For this purpose, who can measure the influence of our environment of beauty?

The primary end of beauty, in its infinite manifestation in nature, is not to give delight to the spirit of man. This delight is indeed necessary, just in the degree in which the human spirit is in harmony with beauty. But precedent to this, beauty has an office to perform. This office is, to aid, gradually, insensibly, in bringing the nature of man into harmony with all perfection, into fitness for its own highest use. In beauty we have another spiritual reality, another manifestation of the Infinite Being, of whom it is written that "strength and beauty are in His sanctuary," a term by which the universe is understood to be meant, and another means by the influence of which man shall ultimately be made a partaker of the nature of God.

We have now seen the coöperation of force, truth, love and beauty in this supreme beneficent work, but for this work all these influences are not sufficient. The task is too great. More, very much more, is needed even than these.

SUFFERING.

The Bible is true. It harmonizes with nature at every point. We have now arrived at the supreme exhibition of this harmony. We find it to exist in a two-fold respect.

First.—The Bible declares the purpose of God with respect to man to be his restoration to a state of holiness. In its own wonderful language, language such as no man who could form the conception would dare to employ, it declares it to be the purpose of God that man should become the partaker of his own nature. This result is the supreme end of revelation as made to us in the Bible. It is also the supreme end of revelation as made to us in nature. The same infinitely beneficent purpose animates both. Every influence in nature is ceaselessly exerted to bring man into harmony with God. This is also the declared purpose of the teaching and motive to the death of the Christ. Deep and precious spiritual verities interpenetrate all the forms of the physical creation. These are also the things with which the Bible is filled. They who penetrate most deeply into either come at last to the same animating force—the infinite love of God. On this point, of the purpose of God with respect to man, the harmony between nature and the Bible is strikingly obvious. But this harmony extends further than this.

Second.—Nature and the Bible are in accord with respect to the means by which this purpose is to be effected.

In nature all results are found to be brought about by the concurring action of independent agencies, operating together in harmony. Whenever these results involve a change of condition of a general nature they are reached by slow degrees. While the agencies employed are in ceaseless activity, the changes consequent on their action advance by gradual, often by insensible, steps. This is the law of all progress, or of development and growth. But all intended results are ultimately accomplished. Every

necessary means is always employed. Every appropriate agency is performing its appointed part. As already remarked, in nature nothing is useless, and nothing is wanting. This is the case throughout the physical creation, and it is especially to be seen in the multiplied relations that this creation bears to man. This law, of the harmonious coöperation of different agencies, and of their united efficiency and sufficiency for their purpose, is shown in its highest manifestation, in its application to the most remarkable of all changes, namely, the change in the spiritual condition or nature of the human race.

No change ought to interest the philosopher so deeply as this. It is one of a completely radical character. It affects the very spring of all human activity. It is a transformation of man, from a being wholly false to a being wholly true; from a being wholly hateful to a being wholly lovely; from a being wholly selfish to a being wholly self-sacrificing; from a being wholly vindictive to a being wholly forgiving—in short, from a being in a state of complete antagonism with the nature of God to a being in complete harmony with that nature, a partaker of it. It is a change so total, that it could be expressed by the Christ only under the tremendous figure of being born again. We observe this change in its progress, and are ourselves the subjects of it. All human beings are more or less affected by it. Probably none remain absolutely in the former state, as none can attain to the latter. One effect of it is seen in the spontaneous impulse moving those who are most advanced to help on those who are less so.

This is the change that the Bible, giving verbal expression to the teaching of nature, declares to be the supreme purpose of God with respect to man; and concerning the means for the accomplishment of which purpose we are to see again the Bible and nature in accord with each other. The Bible calls upon men to observe the exhibition of the truth and love of God in the endlessly varied forms of its manifestation, and to conform both his conduct and the motives of his conduct to the perfect pattern thus set before him. It does far more than this. It recognizes the fact that these alone are not sufficient. Another agency,

acting in harmony with these, but of a more compelling nature, must supplement their influence. This last is necessary, indeed, in order that the former shall even be perceived, and their power be felt at all. This supremely efficient agency is suffering, in its two forms of vicarious and personal suffering. The Bible declares this to be the supreme and the finally efficient agency, through which this infinitely beneficent purpose of God is to be accomplished.

This is the key that unlocks the mystery of human suffering, mystery only to those who will not learn. Here the facts in nature with which the Bible is in harmony, are necessarily the facts of human experience. Man is the sufferer. And the accordant teaching of the Bible and of human experience is this, that mankind receive all their blessings, this highest of all first; and second, those subordinate benefits that in their own fruition tend to promote this chief good, as the result of the sufferings of others, and are made capable of receiving them by sufferings endured either by the individual himself, or by those from whom he has inherited his disposition. Thus human suffering is seen to be the chief means of good, and moreover to be the means, without which all other means would in this supreme sense be of no avail. It must then be regarded as the crowning manifestation of the love of God to men. No one can make a comprehensive study of the subject without being driven to this conclusion.

The world is full of suffering, both real and imaginary. Religion, the religion of nature and the Bible, utterly dissipates the latter, and makes of the former the means of the highest good. It also enables the spirit to recognize suffering, whatever the form in which it may appear, in its true character. Religion thus fills the soul with light and gladness, and this wholly irrespective of worldly condition. Indeed, the most remarkable examples of spiritual joy are to be found under circumstances where apparently the conditions of existence are unfavorable in the most extreme degree.

Nothing is more amazing than to observe how many of our distresses are of our own manufacture.

It seems to be a common impulse of mankind to pay little regard to their benefits, or even to overlook them entirely, and to fix their attention upon those things from which they can extract misery. Multitudes voluntarily endure more or less suffering, from which minds in a healthy state would be free, and deprive themselves of habitual gladness that such minds enjoy. This abnormal and morbid state or habit of mind accounts for the wide acceptance that the absurd views of pessimism have received.

I once heard of an incident that well illustrates this common perversion. A gentleman who was possessed of enormous wealth, the accumulation of his own lifetime, was called upon by a person well known to him, and who was entitled to his confidence, who solicited him to subscribe a small sum to a local object. When the matter had been laid before him, he replied with a look of severity: "If you knew my condition, sir, I would be the last person you would think of applying to for a contribution to this or to any other object." Amazed, and wondering what catastrophe could have befallen, the visitor began to apologize for his unseasonable intrusion, when the gentleman interrupted him, and continued: "Do you know, sir, that, by the reduction in the rate of interest in this State, from seven to six per cent., I have lost, in the last year, the sum of more than sixteen thousand dollars!"

This loss had been uppermost in this poor man's mind. It had given him constant distress. The mighty inflow of his revenues was all nothing. Like the sun-light, that was a matter of course. It afforded him no pleasure. He was tormented by this inevitable annual loss. To repeat a felicitous simile from Charles Lamb, this was Mordecai in the gate. So deep was the impression made upon his own mind by what he looked upon as this legislative robbery, that it seemed to him that it must impress others in the same way. He actually supposed that his visitor would not only see the necessity for his refusal, but would share in the sympathy that he felt for himself.

Perhaps we will not be so much surprised at such a perversion of all right views, if we reflect for a moment on the fact that, in one degree or another, every one does

precisely the same thing. The mighty stream of common blessings, the flow of which never ceases for an instant, and in comparison with which any income from wealth is nothing, is only feebly appreciated by any, while on the great mass of mankind it makes little or no impression. Most persons never think of it. But any interruption of its current, no matter how slight, let this occur, then they bewail their fate, they feel as if they had been unjustly treated, had been deprived of that which of right belonged to them, and they look for the sympathy of men. Thus multitudes manage to spend their days in darkness and distress, where to the healthy spirit all would be light and joy.

So much for our imaginary woes, the sorrows of our own creation, the offspring of our own darkened and perverted spirits. But every heart has its burden of real suffering, and death, in some unknown one of its innumerable forms awaits every one. These are facts that confront us.

In reflecting upon these two facts, we are obliged, in the first place, to say that they must be consistent with the supreme controlling fact of the universal and changeless love of God. Reasoning from the facts already observed, we are compelled to the conclusion that the same motive determines these that determine all the other conduct of God. It must be that suffering and death are the modes in which infinite love manifest itself under the conditions that exist. Not only so, but it must be that these are the modes of expression of this love that are called for and necessary under these conditions. This is the *a priori* conclusion to which the mind that really believes in the existence of God is compelled to arrive. Here, indeed, it must be true that "things are not what they seem."

The question may be asked by any one, how evil could have entered into the world, how it could have appeared within the government of God. This question may be asked by any one, but it cannot be answered by any one. This is an inscrutable mystery. No finite mind can fathom it. Dr. McCosh declares that he cannot explain it. We only know the fact that the dreadful picture of the natural state of man cannot be adequately drawn. These are the

actual conditions under which the love of God makes its supreme manifestation in the infliction of suffering and death.

I do not wish to dwell upon this subject, which is so vast and with which in its innumerable phases every one is so familiar. Still less do I desire to enter upon the discussion of any of the questions that arise out of it. My only purpose is, in the briefest manner, to call attention to the fact, that human suffering is the necessary expression of the love of God, being the supreme and indispensible means by which the beneficent purpose of God regarding man is accomplished; and that the divine origin of the Bible is supremely shown by the fact that it declares this solution of the great mystery, the solution which all human experience proves to be the true one.

Vicarious suffering involves mysteries to us, as of course it must do. But we know that the entire inheritance of civilized men has been bought by the suffering and death of those who have gone before us. There is no possession that men to-day cherish and hold precious that has not been purchased for them with this price. These constitute the fundamental principles of society. We share in the possession of these fruits of the suffering that past generations of men have endured.

Luxury and splendor have left us nothing that can operate as a present personal boon to men, nothing. For all these things we are indebted to the sufferers who have lived and died for us. Among these, too, we find examples of every virtue that we instinctively revere, and of the conduct which it is the highest inspiration of humanity to ~~imitate~~ emulate. Above all, in wonderful harmony with this law that all blessings for man must be purchased by suffering, the Saviour of men, expected as a conqueror, came as a sufferer, and obtained for mankind its supreme blessing by His death.

Personal suffering is the means by which men are made willing to receive, or become capable of receiving in degree without end, the boon of the new nature which has thus been purchased for them. Thus violation of the law of love is made to work its own cure. In the parable of the prodigal son, it was the want and starvation consequent

on his wickedness that drove the prodigal back to his father's open arms. "Perfect through suffering," heard through the Bible as its grand undertone, swells at last into the overpowering note, in which all the harmonies of revelation become absorbed.

With this agrees all human experience. No one has attained to any degree of true beauty of soul and loving harmony with God who does not recognize suffering as having been the supreme means by which this change of nature has been effected.

It would be foreign to my purpose to attempt to follow this subject further. Like all lines of thought, this one too leads to the hidden, the inscrutable, and the infinite. The conclusion thus far reached is one to which all shades of religious belief must assent.

FAITH.

When we reflect upon the manifestations of the love of God which are presented to us everywhere in nature, we are especially impressed by two of its features, because of these we can most nearly form a conception. They are its universality and its persistency. The love of God, as revealed in nature, is without limit, or preference, or change. Mechanical science teaches this truth in an impressive manner. It is from this science that we derive all our knowledge, and form all our conceptions, of the changeless nature of the divine conduct. This enables us to comprehend, so far as we can comprehend it at all, the meaning of the language of the Bible on this subject.

The reception of these truths, of the universal and the unvarying nature of the love of God, seems to have been, and even yet to be, the most difficult of all things for mankind to become capable of. It has involved a radical change in the dispositions of men, a change that apparently could be effected only in a manner almost inconceivably gradual. The process of this change, both in its duration and in its character, suggests the process in operation through geologic time, by which the void world of fire and rock became transformed into the fertile earth, clad in verdure and teeming with life, and the darkness produced by the boiling and down-pour of oceans gave place to the glory of the revealed heavens, and the changing beauty of the skies.

The small portion of the human family, in whose minds, as the result of a long series of teachings and judgments, the truth of one personal unseen God had finally become fixed, secure against the assaults of idolatry, held, with a degree of fanaticism difficult to be imagined, to the belief that this God was theirs alone, to the exclusion of the rest of mankind. The numerous distinct declarations to the contrary in their own sacred writings had no power to shake this conceit. The first recorded teaching of the

Christ was directed against it. This teaching consisted only in the recital of two familiar events in the Jewish history. But, for the very reason that the obvious deduction from these events could not be avoided, the reference to them by the Christ exasperated His hearers to such a frenzy, that they dragged Him to the brow of the hill on which their city was built, to cast Him down headlong.

In its inception, the Christian church was composed entirely of Jews. The converts to Christianity gave up their dream of the temporal dominion of their race, and accepted the Christ as a King whose kingdom was not of this world; but that the good tidings of great joy should be to all people, that was more than Jewish jealousy could endure. So, as the gospel spread among the Gentiles, the Jews became united in rejecting it. Since then they have listened, in their synagogues every Sabbath day, to the reading of the Scriptures, in which are contained such expressions as this: "It is a light thing that thou shouldest be my servant, to raise up the tribes of Jacob, and to restore the preserved of Israel; I will also give thee for a light to the Gentiles, that thou mayest be my salvation unto the end of the earth;" and they have waited, all the same, through nineteen centuries, and are waiting still, for their exclusive Messiah, who shall restore the kingdom to Israel.

The taming of human ferocity, and the weakening of the spirit of exclusiveness, neither of which were by any means confined to the Jewish race, have advanced by such gradual steps, that their progress can be observed only by comparing the state of society at periods separated by long intervals of time; and often it has seemed as if humanity had actually retrograded. In the church of the middle ages the unbaptized came to take the place, that in the Jewish mind was held by the uncircumcised, of the hated of God. So lately as the sixteenth century, William of Orange was, perhaps, the only man in Europe, who seemed to realize that it was not the duty of the dominant religious sect, whatever that sect might be, to use its power for the punishment of disbelievers in its creed. The best of men in their turns exercised the very intolerance against which their own lives were a protest. They knew not what

spirit they were of. But it was the spirit of their age. This fact ought to be taken into consideration in judging of their conduct. We have no right to arraign them for having then fallen short of a standard, that is too high for all but a few even in our own time.

Confining our view now to the Protestant Church, we observe that the same exclusive disposition, in modified forms of expression, has produced the Calvanistic doctrine of a limited atonement, now happily in a large degree outgrown, has attached especial importance, and given especial prominence and perversion of meaning to the doctrine of election, and has appeared feeble and ludicrous in "the uncovenanted mercies" which used to be vouchsafed by the charity of the churchmen to those outside of their fold. Harmless traces of the same spirit of exclusiveness still longer among sects of Christians, who have grown to such a catholic spirit, that the only thing they cannot tolerate is the idea of toleration.

When we turn to the Roman Church, common sense, to say nothing of humanity, stands aghast at hearing eternal damnation denounced against whomsoever may dare, not only to deny the spiritual supremacy of the Pope, but also to oppose his claims to any temporal possession, and even to resist the despotism of a parish priest. How long, O Lord, must the earth continue to witness this awful farce! As if the God, whose nature we are feebly endeavoring to contemplate, could have committed the eternal state of even a single soul to the caprice of vindictive men. And to think of this pretended power being used for the enslavement of the human conscience.

In spite of revelation, men have found many ways of creating imaginary Gods after their own image. This was especially true in the Christian Church in the centuries preceding the cultivation of physical science. The analogies of a judge and of a king, pressed far beyond any warrant afforded in the Bible, have been made especially fruitful in absurdities. The familiar examples of these human potentates, with the well known characters of those who were most prominent in history, the methods and the mediums of approach to them, the capriciousness of their conduct, and the uncertainty of the result

in cases of appeal to them, all these associations have exercised a most perincious influence on the habit of religious thought. Traces of this influence still appear even among the most enlightened Christain communions, while elsewhere these human analogies now hold millions of professed Christains in practical idolatry.

But of greater power, to blind the human mind to the true conception of God, than even man's exclusiveness and intolerance, and misleading human analogies, have been the deep and lasting impressions that have been left upon the Church by Paganism. From Paganism the church has, among other things, derived the priest and the sacrifice, which is a remnant, not of Hebrew, but of pagan rites, the queen of heaven, the canonization or semi-deification of men, the ideas of informing and of appeasing an absent and angry God, and the doctrine of purgatory. On this last suggestion the church seems to have improved. The schoolboy reads the original fable in his Virgil, butwe do not learn that the priests of Jupiter ever thought of the stupendous account to which it could be turned.

But above all, the church received from heathen antiquity the dogmas, that ignorance is the mother of devotion, and that reason and faith are antagonistic to each other. In their original application these dogmas were perfectly true. There could be no reconciliation between the philosophy of Greece, in the ages of its maturity, and the system of classic mythology. The philosophers then realized, perhaps as clearly as we do now, that the deities, who received the adoration of the vulgar, whose worship was woven into the fabrics of their domestic and social and political life, in whose temples and images art gave expressions to its loftiest conceptions, the stories of whose births and deeds constituted the chief intellectual possession of the multitude, and the imposing ritual of whose service awed and held captive their imaginations, were all airy nothings, who from the poet's pen had received their "names and habitations." So when philosophy and Paganism met in the same communities, nothing could be more true than were these two dogmas. Ignorance *was*

the mother of devotion, and between reason and credulity, miscalled faith, there was complete antagonism.

As the Christian Church degenerated into a mighty system of imposture, with which it combined a system of extortion that paganism never knew, it naturally accepted and made full practical use of this legacy, the endurance of which has seemed to be one of the phenomena of history. The fact is, these maxims of Paganism have endured, and still endure, because they are true in their application to all human substitutes for true religion. While the latter demands the exercise of the highest intelligence, every form of the human counterfeit shuns its searching light. Moreover, the merely traditionary influence of those dogmas, especially of that one which declares an antagonism between reason and faith, is felt universally even to this day; and that in a degree that illustrates how difficult a thing it is for the mind to shake off the chains of a falsehood that bears the stamp of age upon it. This dogma still exercises an insidious power, even where religion has been most cleansed from man's defilement, and over minds by whom the naked proposition, in its terms, would be instantly rejected.

But O, my friend, let us get away from these exhibitions of human infirmity, and cast off from our spirits the spell of their misleading and contracting and degrading influences, and come forth into the presence of the God of all revelation. So far, too, as we may, let us rise above the effects of familarity with the amazing exhibitions of his love, and behold this love as, universal and changeless, it enfolds us on every side. Let us lift our eyes to to the heavens, where the Almighty has written his name, and see the sun forever shining in his strength, not with partial glory, but to quicken into life and gladness alike each individual being, to reveal alike every object, to penetrate every eye. Let us look upon the earth, that cannot forget one grain of sand. And as we behold this glory and realize this care, and as we feel the animating breath of the universal air, let us receive into our minds the great truth, that everything was intended to promote the growth, and to encourage the exercise, of faith toward God in the soul of man.

This faith can, of course, have no existence, where there is no perception of God in his works. Where the unmeaning expression, "the uniform course and constitution of nature," rises like a wall before the sight, and the spirit feels no impulse to penetrate beyond this senseless jargon, beyond which all truth in reality lies, nothing but darkness is possible. But to the illumined spirit, that sees in all the activities of nature the eternal faithfulness of the infinite Father, the unvarying activity of his love, that realizes how, in its utter helplessness, it is every moment carried in his arms, and folded to his bosom, that feels the rapture of conscious participation in his affection, to such a spirit faith is the natural and necessary state.

In the perception of the changeless nature of the universal and infinite love of God we find the real and only ground of faith. It is obvious, that faith follows necessarily from this perception, and must exist in the soul just in the degree in which the perception itself becomes clear and distinct. The two are inseparable. Faith cannot exist where the love is not perceived, and it cannot be wanting where it is perceived. It must co-exist with the apprehension of this love, just according to the degree of its apprehension.

We conclude, therefore, that "reason" and faith must harmonize just in the degree that "reason" has the facts presented in consciousness; all of which facts are necessary in order that "the reason" shall arrive at a correct conclusion. The harmony between "reason" and faith must become more complete as the spiritual comprehension grows larger, and as the images that are formed in consciousness by the highest modes of our spiritual activity became more distinct.

As this symmetrical intellectual and emotional development of our nature goes on, we must perceive more and more clearly the analogies with which the creation is filled, that illustrate the relation of the soul of man to God. Everything tells us, with continually more clear and delightful voice, the everlasting story of our Father's love. As we know that the earth will not fly away and leave us desolate in space, so we know that nothing can ever sepa-

rate us from the Infinite Being, between whom and us exists the attraction of love.

Two results follow from the development of faith; or rather, two things attend this development and grow in degree with it. The first of these is the perception or realization of the truth, that the state of harmony with the nature of God is the only real good, and the want of this harmony is the only real evil; that all other seeming good or ill is really so, and is to be desired or to be dreaded, only as it will promote, or will hinder the attainment of this state of harmony, which becomes the object of supreme and exclusive longing, just in the degree that the spirit has already attained to it. The individual of necessity in the same degree rises superior to the vicissitudes of time. External conditions have less and less power to affect his repose. He becomes able even to glory in tribulation. He knows that trials and distresses are the crowning assurance of the love of the Father, who by these means draws the soul more closely to himself.

The second result is intimately connected with the first. The spirit has found the source of joy. There is no pessimism now, no repinings seek for expression now. The spirit sees in all around it the reflection of its own gladness. It rejoices in the realization of the truth that this is a good world, that it is the very best world that Almighty Goodness could make, that everything in the earth and the heavens is intended to minister to universal gladness, that the normal, healthy state of every being is a state of joy. The spirit rejoices especially in all the influences which tend to enlarge its powers and capabilities, and quicken it into every form of healthy activity. It rejoices in everything that helps it to form the grand conception of the universal and necessary nature of the truth and love of God, that infinite and changeless reality, of which the whole nature of things is the mighty manifestation.

Let us turn again to the Bible. Is this book in harmony with nature here? Yes, emphatically yes. This dependence, this care, this trust, this joy, the Bible is luminous with all these. In these respects, also, the Bible appears as the verbal expression of the truth that exists in the nature of things. About this expression it is also to be observed,

that it is not such an expression as could be made by any finite mind. It transcends the degree of our comprehension of these truths. It is of a nature to raise the mind gradually to a fuller and fuller apprehension of them ; and that apprehension that is the deepest and the fullest finds the language of the Bible satisfying, and more than satisfying. This language is still stimulating. It conveys to the mind as this becomes capable of receiving it, a sense of a degree of care and trust and joy to which there is no limit. This is especially true of the words of the Christ. When we reflect upon the character of the expressions that are employed by the Christ for the presentation and illustration of these themes, we cannot fail to perceive that the language applies to realities that are infinite in their nature, and that these realities are completely apprehended by the mind from which the language proceeds.

PRAYER.

I should not have presumed to touch this high theme if it had not appeared to me that the true view of the nature and office of prayer grew directly out of the preceding line of thought; and that, therefore, the presentation of such a view in this connection would tend to remove doubts respecting the efficacy of prayer which exist in minds to whom these papers are especially addressed. These doubts have been encouraged by criticism from high scientific authority, criticism that was imagined to be based on scientific grounds, but which, in reality, proceeded from an entire misconception of the subject.

The question is a common one: "How is prayer to God to be reconciled with the idea of his changeless nature?" "If the purposes of God move on eternally to their accomplishment, like the earth in its orbit, how are these purposes to be modified or the events to be affected, in the least degree, by prayer?"

This question is not to be answered directly, but it disappears, as a reasonable expression, as soon as we have got a correct idea of the nature of prayer.

The common idea of prayer, and the idea which gives apparent point to the above question, has been in a large degree derived from human analogies, which here, as everywhere else, are inadequate and misleading. A petition addressed to an earthly potentate or tribunal or parent is always designed to influence the party addressed. It is intended, first, to afford to this party information that he did not before possess, and, second, to incline his mind favorably towards some object, from a previous state of indifference, or from a contrary inclination. The design of the petition is always to induce the party to whom it is addressed to form or to change a purpose, and the result of the application is always uncertain. All these notions, derived from these human analogies, underlie, and contribute more or less to influence or to form, the common idea of prayer to

God, so far as this idea has any definiteness in the mind. It may be added that this idea of prayer is naturally formed by minds which have no experimental knowledge of its true nature. Moreover, such minds may often be disposed to insist on this conception as being the only one possible to be imagined, as it is the only one that they themselves can form. The true nature of prayer is, however, very far removed from any such conceptions.

Prayer is the highest form of coöperative action required on the part of man. It is the coöperative action on his part upon which the reception by him of the highest good has been made dependent. In preceding papers it has been shown that our own coöperation, to the full extent of our ability, is essential to the obtaining by us of any good whatever. It was shown that there are various modes of this coöperation, that these modes of necessity differ according to the nature of the benefit that is sought, but that in all cases alike the faithful putting forth of our own coöperative effort is the condition upon which we receive the benefit. We observed that in each case there is comparatively little of the work that had to be done that we have been made capable of doing, that the doing of that little requires the exertion of our utmost efforts, and that it must always be done by us.

We are not to inquire why this is so. Our observation and our conscious experience both teach us the fact that the requirement is a universal one. We cannot imagine an exception to it. Our own coöperative effort is always necessary, and, other things being equal, we receive everything in a degree that is proportionate to the earnestness and fidelity with which we do our part.

Now the highest possible good of every human being is not anything of an external or of a temporary character, neither does such highest good consist in knowledge or in intellectual power. The supreme benefit that can be conferred upon any individual is the transformation of his nature. The object that is supremely to be desired by every rational being is, that his own nature shall be brought into a state of harmony with the nature of God, or, in the stronger and deeper language of the Bible, that he shall be made a "*partaker* of the divine nature."

It cannot be conceived that in the case of this supreme good an exception should exist to the otherwise universal law, that man should have this blessing alone thrust upon him without any coöperative act on his part. Neither can it be conceived that, while in all other cases the receptive state of our being is an active state, in this case only it is a passive one. In some way, then, man must actively coöperate in the work of receiving this blessing. There must be something that he can do, and that he must do, with all the energy of his nature. There is only one thing that he can do.

This is to pray. When an individual recognizes at once his need and his helplessness, in this supreme respect of the radical and complete transformation of his nature, he intuitively cries out: "Create in me a clean heart, O Lord." Just in the degree in which an individual perceives this need and this helplessness, in which their reality is disclosed to him, just in that degree, of necessity, will his supplication be earnest and persevering. Thus it has been with sincere men in all ages and among all people, according to the light that each one has possessed. It is affecting to read the prayer of Socrates as recorded by Plato: "O Pan," (that is the All, nature,) "and all the other divinities whom we adore in this place, give me inmost beauty of soul."

The fact must be stated again, that the only thing which man can do towards obtaining this supreme good, is to make this supplication. This is the form, and it is the only form, of coöperative effort, that is demanded from man, as the condition on which alone he can receive this gift, between which and all inferior gifts there can be no comparison. Prayer is the mode of effort that is adapted to the nature of the purely spiritual good that is sought by it; precisely as labor and study are the modes of effort that are adapted to the various forms of inferior good that are sought by them.

Between all these modes of effort there exists a likeness, that may not be perceived at first. Both labor and study are the practical modes of asking for the benefits that are obtained by those means respectively. In employing them, we express our desire for those benefits in the only

practical way, namely, by putting our minds into a receptive condition, and making use of the obvious means for obtaining them. So also in prayer, man puts his mind into the only condition in which it is capable of receiving this spiritual good, and employs the only and obvious means of obtaining it. By the obvious means is meant the means that suggests itself to the mind that is filled with the desire after holiness, as naturally and necessarily as the suitable means for obtaining any forms of inferior good suggest themselves to the mind that is filled with a desire after them. So labor and study and prayer are the practical expressions of these different desires, in modes adapted to the nature of each one.

But the objector may say: "Still, prayer is an effort to change a result, that, from all eternity, has been fixed in the purpose of God."

The reply to this objection, which at once exposes its superficial nature, and reveals the fact that it is founded upon our own ignorance and limited power of thought, is this: The objection lies equally against every other form of coöperative effort on the part of man, or, against all human activity whatever.

It is true respecting this spiritual benefit, and equally true respecting all other benefits, that they are alike of necessity fixed in the eternal purpose, and that at the same time they are made dependant on our own exertions. But men do not raise this difficulty in other cases. They are not at all troubled about the fact that if they do not sow they will not reap, if they do not observe and study they will not learn, or if they do not put forth the adequate effort they will not accomplish any result whatever. They never think of inquiring what the fixed purpose of God may be in these respects, or of looking upon their exertions as attempts to change the divine purpose. In all these cases men inquire only what there is for them to do, and they gird up their loins, and apply themselves in earnest to do it. So we have no more right, and it is no more natural to sincere men, to be troubled about the dependence of spiritual blessing upon the employment by us of the means of prayer.

The observation is a familiar one, and is applicable to

our work and study and prayer alike, that the means must be ordained just as absolutely as the result. We can, however, hardly pretend to explain the mystery in which the whole subject is involved, and which is only one of the wilderness of mysteries in which we have our being. It is very certain, however, that such questions should give us no more concern, and should have no more effect upon our action, in the case of prayer, than they should respecting any other form of our mental or physical activity.

A special objection is often urged against prayer, which is, that no connection can be perceived by us between prayer and the answer to it, as there can be between labor or study and their results. The inference that the objector would like to have drawn is, that because such connection cannot be perceived by us, therefore such connection cannot exist. In a former paper attention has been called to the major promise of the syllogism, from which such a conclusion would follow.

In truth, however, when we attempt to enter upon the subject of the relation between cause and effect, we at once find ourselves beyond our depth. We know nothing beyond uniformly observed sequences. The nature of the connection between the precedent and the consequent act is hidden from us in all cases alike. A familiar illustration may make this limitation of our knowledge more obvious. In crossing the bay, one looks upon a vessel that is being towed by means of a line, and then at the moon. He observes that he can see what compels the vessel to follow the tug, but cannot see what holds the moon to the earth. One looking more deeply, however, will perceive that he cannot discover the compelling force any more in the one case than he can in the other. What we term the attraction of cohesion, by which the rope is held together, is in reality as much a mystery to us as the attraction of gravitation is. So also, and in a sense that is no more absolute, the sequence between prayer and its answer, as well as that which exists between labor and its reward, are both alike among "the secret things" that "belong unto the Lord our God."

Prayer is the real desire of the soul. Whatever in its

depths the soul longs for above all other things, that is the object of its prayer. When this longing of the soul is after the state of holiness, for itself, for others, for all mankind, then, just in the degree in which this desire takes possession of the soul, and all other objects are lost sight of in the realization of the incomparable value of this good, just in that degree does the soul become a co-worker with God in this supreme sense.

The line of thought which has been followed seems necessarily to lead us to the conclusion that prayer is the natural and spontaneous act of the spirit to which God has in some degree been revealed, and that it is the mode of men's coöperation with God in the work of His own restoration to a state of holiness; that supreme work to which all man's environment of force and truth and love and beauty in the physical creation is designed to contribute, as its ultimate purpose, that work for which the supreme manifestation of infinite love in the great mystery of the crucified Christ was given, and finally that work which all human suffering, also, is adapted, and so evidently is designed to aid in accomplishing.

Let us now turn to the teaching of the Bible on this subject. Here, as everywhere, we shall find the Bible to harmonize with and to complete the teachings of nature. The Bible gives to this teaching distinct expression. It is its audible voice. In the Bible this natural command to the coöperative activity of prayer, like all other natural commands, finds living and adequate utterance.

For our first illustration we turn to the Lord's prayer, which is the only form of petition that was taught and enjoined by the Christ. Here the following features are first to be noted. This prayer is to be addressed by every individual directly to God. No supplication is to be made to any other being, not even to the Christ, as distinct from the Father. All intermediate aid is excluded. No creature is to come between the soul and its Father in Heaven. The very ideas of representation, or of the removal of God to a distance from the individual suppliant, would seem to be made impossible. Instead of all this, the language of this

prayer assumes the fact that, everywhere and at all times each individual soul is already and continually in the immediate presence of God. In all these things we recognize what we know to be the truth with respect to the God of nature.

We come now to the prayer itself. That which is the supreme object of desire naturally rises first of all for expression, and is longest dwelt upon. So, after the fond address, expressive of the endearing relations existing between the soul and God, there comes first the prayer for the coming of God's kingdom, or, in other words, for the restoration of all mankind to the state of holiness. This petition is repeated three times, in words which, though very different, mean in reality the same thing. This threefold repetition shows the earnestness with which the recovered soul dwells upon this supreme object.

While the accomplishment of this triune petition involves and depends wholly upon the restoration of mankind to a sinless state, while this is the work, and the only work, to be done in answer to these petitions, still in their form these petitions present the glory of God as the supreme object of desire, and do not, except by this necessary implication, refer to man at all. This, it is evident, is the form in which adoring love must of necessity frame its supplications.

Besides that which is directly expressed in this threefold prayer, there are implied in its language two things which are of the deepest interest. The first of these is, that there exists now a state of being, in which the will of God is perfectly done, in which absolute harmony and unity with the divine nature prevails. The second is, since we cannot suppose that we have been taught to utter an idle petition, but rather one that must surely be fulfilled, that on the earth also, and in the same perfect degree, God's name shall be hallowed, his kingdom shall come, his will shall be done.

From the great height of this comprehensive petition, the prayer now descends to the lowly supplication for personal mercies. It asks for nothing beyond immediate necessary provision, and expresses a sense of the absolute dependence, which is man's real condition. "Daily bread"

is an expression that, in the light of all the teachings of the Christ, it appears certain ought here to be taken in a spiritual sense. It is a part of that vivid figurative language, by the contemplation of which we may rise above earthly wants, even until we reach the mystery of the divine man, who declared, "I am the bread of life."

Thus regarded, this petition is seen to be a repetition, in a personal sense, of the former general and comprehensive ones.

The spiritual meaning of this petition is that to which the greatest importance is attached throughout the teachings of the Christ. This subject will be dwelt upon with more fulness directly.

After this there follows the fearful petition with a condition. This condition was directly after explained and emphasized by the great Teacher, with the assurance that in the very nature of things it is only the forgiving soul that can receive forgiveness. Here we discover again the operation of the law of likeness. Just as the revelations of truth and love and beauty are possible only *to* truth and love and beauty, so forgiveness is possible only to forgiveness. We recognize another phase of the universal harmony that runs through the spiritual creation.

The prayer then closes with a petition, likewise repeated in substance, for the spiritual watch and care of God.

It is to be further observed respecting prayer, that in order to be effective it must be the habitual state of the mind. Precisely as in all our other forms of coöperative effort, so also here, it is the long continued labor or application of prayer, that are alike demanded and rewarded. There must be in prayer the same fixed and habitual concentration of the whole being, that men who are capable of strong purpose exhibit with respect to anything whatever about which they are in downright earnest. And, indeed, prayer calls for this concentrated and persevering earnestness in the highest possible degree, as the object that is sought is of inconceivably greater consequence than any other object can be.

This is illustrated in the prayer of Solomon for wisdom. The selection of this illustration may perhaps surprise the cursory reader of the Bible. Indeed the real character of

this prayer, in this respect, is generally misapprehended. So much is this the case, that the answer to the prayer of Solomon is often cited to show the imagined special and capricious action of God, in favoring whom he chooses, without being governed by a general principle. The erroneous and superficial nature of this view will at once appear.

In considering this petition, we are struck with the fact, that when suddenly the command was addressed to Solomon: "Ask what I shall give thee," the answer of the youthful King was ready. There was no hesitation about its utterance. It was also single. He made but one request. Although not limited in any way he asked for only one thing. He asked for wisdom and knowledge "to judge this thy so great people," and he ceased.

Now when we reflect upon it, it is evident that this could not have been a desire suddenly formed, in its singleness and distinctness, and expressed on the spur of the moment. This must have been the ripened and absorbing longing, with which the whole being of Solomon was already filled, in order that it should rise thus spontaneously to his lips, and find clear and eloquent utterance, at the instant of demand.

But we are not left to conjecture on this point. In three places the prayers of David for his son are recorded to the same effect, and one of these prayers is expressed in this very same language. The history is thus brought sufficiently before us. This had been the habitual petition for Solomon of his father before him. Solomon had listened to this petition from his infancy, and had made it his own. It had become the habitual state of his mind. When the responsibility of ruling was cast upon him, this longing for knowledge and wisdom from God became in the highest degree intensified.

Then, when the instant of test came to Solomon, as it comes to all without a warning, when the work of years in the formation of character is to be shown in the act or decision of the moment, "ask what I shall give thee," there could be no struggle, nor any hesitation, because there was no other desire *in* his heart, except the life-long one that filled his whole being.

In addition to the Lord's Prayer, much of the teachings of the Christ relate to the subject of prayer. These instructions are of the deepest significance. Our present view of them must be limited and general.

In studying the words of the Christ, we find, among their many striking features, two with which we are now especially concerned. These are, their simplicity and, on appropriate occasions, their intensity. Respecting the first of these features, it is to be observed among men, that when, as the result of deep and prolonged study, a person has become familiar with any particular subject, it is generally the case that his statements and explanations of this subject become simple and direct, and this just in the degree of his familiarity with it. In this respect there is no human teaching, that can, in the most remote degree, be compared with the absolute simplicity and directness of the language, respecting the deepest truths, that was always employed by the Christ.

But the language of the Christ frequently presents a startling boldness of imagery and an intensity of expression that is entirely unique. In this respect, also, it differs from all other recorded speech. As the parables of our Lord required for their production, first, an absolute comprehension of the spiritual truths that were to be illustrated, and second, an intimate knowledge of the duality of the creation, by which all common and familiar things are made adapted for the illustration of these truths, so in *all* the teachings of the Christ we perceive the same absolute knowledge of truth, and of the impossibility of its being compromised by admixture with the least degree of error. This demanded for its expression the ultimate and hitherto unknown power of language, language nothing like which has ever been employed since, as indeed it never could be by a finite intelligence.

In addition to these features we have everywhere, also, the form of authoritative declaration. The Christ never reasons. He assumes the office of declaring spiritual truth. This he does in language that is plain to the most simple understanding, and which, at the same time, is found by the thoughtful student to present depths of

meaning that are too profound for human plummet to sound.

All these features characterize the utterances of the Christ on the subject of prayer. The great primary object of prayer is distinguished by him with singular vividness. He commands men to ask in prayer for only one thing, as its sole appropriate object. He dwells principally upon negative instruction. Most of his teaching is directed to declaring what we are *not* to seek for in prayer. The full meaning of the language of the Christ, as this is given by different evangelists, is believed to be expressed as follows: 'Have no anxiety about your daily wants.' 'Be not concerned about your part of the universal bounty.' 'Be not tossed on the billows of care.' "For," he adds, "your heavenly Father knoweth that ye have need of all these things." "Consider the lilies." "Shall he not much more clothe you?" "Behold the fowls of the air." "Ye are of more value than many sparrows." Who shall measure the meaning and the tenderness of the language of the Christ on this subject? Although its significance is only feebly apprehended, yet it reaches to the heart of the human race, and is cherished by mankind among their most precious treasures.

It is to be observed that the importance of this instruction, as to that for which we are not to ask, is emphasized by the Christ, by the repetition and fulness of illustration with which he dwells upon it. But there is one thing about which we *are* to be concerned. There is one thing which we *are* to seek, and that with all the earnestness of which we are capable. "Seek ye the Kingdom of God."

Concerning this kingdom, the Christ gave to mankind this command and promise: "Ask, and ye shall receive." This is among the simplest forms of speech, but how much does it contain! Let us emphasize the first word, the command, *ask*. Now we have presented to us the necessity of asking, as the condition of receiving this gift. We are taught that man must coöperate, in the only possible way, in the work of imparting to him this supreme good. A mystery is involved in this necessity that we cannot fathom. We recognize the fact, however, that obedience

to this requirement in the act of prayer is in harmony with the universal law of coöperation. Here, as everywhere else, our will must harmonize with the will of God. His desire to grant must be met by a corresponding desire on our part to receive. This desire must, in this, as in all other cases, manifest itself in appropriate activity. With this voluntary coöperation on our part all the infinite yearning of the Father may not dispense. This is the uniform teaching of the Bible, which closes with the symbol of our coöperative act in drinking: "Whosoever will, let him *take* of the water of life freely" However trifling the act that is required on the part of man, that act must be voluntarily performed.

These few words have been given to the command. We now pass to the promise: "Ye *shall* receive." The Christ here declares the necessary connection between asking and receiving this unspeakable gift. In this case also, the consequence that was attached by the Christ to this promise is shown by its repetition. It is presented to us six times, in six different forms of expression, growing in force to the end. Then in addition a contrast is stated between the certainty of the gifts or expressions of affection of God and of man, which is important to be dwelt upon, as proving also the divinity of the speaker. David had said: "Like as a father pitieth his children, *so* the Lord pitieth them that fear Him." It is to be observed that human language never went further than this, and that because it could not. This expressed the uttermost limit of human experience or power of conception. No deeper emotion can form its image in our consciousness. But the Christ says: "If ye then, being evil, know how to give good gifts to your children, *how much more* shall your Heavenly Father give the Holy Spirit to them that ask Him?" How much more! No finite mind can measure the meaning of these words. It is only when we consider the faithfulness of God in nature, as shown in the unvarying uniformity of His beneficent activity, that we can form in our minds some notion of the absolute nature of the connection that is here declared by the Christ to exist between our asking

and receiving this spiritual gift. In these words of the Christ we hear the same voice to which we listen in the physical creation, declaring His own unvarying truth in all His conduct. This supreme and inconceivable good is thus declared to be made wholly dependent on our prayers, and also certain to be given in answer to them. The Bible, to which we have appealed, teaches uniformly that prayer is the mode of man's coöperation in the reception of this good.

But Christians cling to the feeling that they should pray to God for everything. They ask if it is not their duty to do so. Ought not men, they say, to ask God for everything for which they are dependent upon him? This question, which is without doubt pretty nearly a universal one, shows three things; a want of faith in God, a feeble realization of the infinite difference between all earthly benefits and the single spiritual good, and a disposition to ignore the positive and earnest command of the Christ. Let us look at the obvious reasons for this command. There is, in the first place, unspeakable danger that the desire after inferior benefits, or to escape from inferior ills, may take in the mind the place of the desire after the infinite good and to escape the immeasurable ill; that the lesser may engross our thoughts and care, and may hide the greater from our sight. There can, in fact, be no doubt that this disastrous result is always produced in some degree, and generally in a large degree. This tendency it is, against which these commands of the Christ were expressly directed, and which is to be overcome only by absolute obedience to them.

It is also to be observed, that there is only one thing, about which we are certain what the will and purpose of God is. That is, the re-creation of our nature, of the natures of all mankind, into his image. This is the one thing for which we can ask in the full certainty that our desire is in harmony with the divine purpose. But here we must stop. Concerning any inferior object of desire, we cannot generally have the least idea whether its possession would promote or would hinder this supreme blessing. We

cannot imagine whether our prayer would be in harmony with, or contrary to, the beneficent purpose of God. If the individual is really seeking the kingdom of God, with the faintest appreciation of its nature, how is it possible for him to have any desire, respecting anything else whatever, except to leave it in the hands of God. It would seem as if, to the soul filled with faith, everything, joy or sorrow, prosperity or adversity, health or sickness, life or death, would be equally welcome, because equally certain to be the means that its Heavenly Father was employing to convey to it the single and priceless object of its desire. This seems to be the only correct mode of reasoning on the subject. And when we cast our eyes about us, how often do we see the possession of apparent temporary good to be a curse, an evident and obvious curse, and privation and distress and sorrow to have been blessings beyond all price.

We turn again to the words of the Christ. "Sell all that thou hast." 'Let nothing come between thy soul and me.' With what tremendous language does he repeatedly drive this demand through and through the soul. Then comes the tenderness, and revelation of the method of divine love: "Blessed are they that mourn." Then the assurance, while we obey the command: "Seek ye first the kingdom of God and his righteousness," that without our asking "all these things shall be added unto you."

In the light of this express teaching of the Christ, we feel an emotion of awe when we turn back a thousand years, and read the answer of God to Solomon: "Because thou hast *not* asked. * * * I have given thee." Observe the language: "*Because* thou hast not asked." Solomon was animated by the single spirit of consecration to duty. He saw that he must become a means either of good or of harm to his people. The absorbing desire of his heart was that he might be kept from the latter, and be enabled to achieve the former, of these two ends. This anxiety filled his mind, and it was not possible for him to entertain any desires of a personal nature. "And God

said to Solomon : Because this was in thine heart, and thou hast not asked riches, wealth or honor, nor the life of thine enemies, neither yet hast asked long life * * * Behold, I have done according to thy words * * * And I have also given thee that which thou hast not asked."

A thousand years apart ! The words of God ! "Because thou hast not asked, I have given thee." "Seek ye first the Kingdom, and all these things shall be added."

It would seem that with the very beginning of faith there must come the prompting to leave *all* inferior things without anxiety to Him, whose care over every creature is infinite, and who only can know by what means to convey to the soul that good which is the single object of its desire, both for itself and for its fellow beings. This trust cannot hinder, but, on the contrary, it must quicken, the individual in the performance of every duty. It forms the only sure ground of fidelity. It elevates the soul above the reach of repining. It increases its capacity for happiness, as well as its ability to impart happiness to others. It gives to the spirit a serene tranquility that enables it to exert all its powers most effectively, and so becomes in the highest degree conducive to its usefulness, in every occupation and relation of life.

We are brought to this general conclusion, that prayer is that highest form of our coöperative activity, which has for its appropriate object the restoration of mankind, of ourselves, and our race, to a state of holiness, an object which is inclusive of all those subordinate objects that may be conducive to this supreme result.

The spirit that lives in any degree in a state of harmony with the divine nature cannot fail to desire the blessing of God upon its work, upon that which is the object of its just and honest effort, whatever the nature of that effort may be. A notable example of this is referred to in the Introduction to these papers. This desire such a spirit necessarily feels, and longs to give expression to it.

The desire itself, however, is commonly vague and indistinct, and so the expression of it is often general and indefinite. This is a great pity. It would be a gain every way if in all cases a clear and distinct meaning should be attached to this petition, and if this meaning should assume definite expression. On this point, as on so many others, mechanical science affords a real help. We may here listen to its final lesson. It will be the same lesson that we heard at the beginning. In mechanics, we cannot accomplish anything unless our purposes are in harmony with the purposes of God. The object of all study and of all experiment in mechanical pursuits, is to ascertain those eternal and unchangeable purposes in order that our own may be brought into accordance with them.

Intelligent prayer for the blessing of God on our mechanical work, whether this work, as was the case with George Stephenson, be a bridge across an arm of the sea, to be built on a plan as yet untried, or whatever it may be, whether it involve great or small responsibility, must, it is obvious, be a prayer, first, for such insight as shall enable us to comprehend all the conditions and requirements of the problem, and then for such fidelity and watchfulness as shall ensure our compliance with these conditions and requirements in every particular, from the greatest down to the least and most insignificant. This must be the prayer. And with this prayer there must be joined, and of necessity there will be, since it is prompted by the same disposition, first, the earnest study of these conditions and requirements, and of the principles and laws that are involved in our work, and, united with this study, the ceaseless watchfulness and the faithful doing of everything that is devolved on us to be done.

The universal application of this lesson is obvious. In the verbal revelation we have imparted to us the changeless principles that are to govern our conduct in our relations to our fellow-beings and to God; precisely as in the physical revelation those principles are made known to us that must govern our conduct with relation to matter. By

obedience to the former, precisely as by obedience to the latter, our conduct is brought into harmony with the conduct of God.

Intelligent prayer for the divine blessing on our conduct in every situation and station in life must, then, be a prayer, first, for a clear knowledge of these immutable laws of conduct, for that complete possession of them, or possession of ourselves by them, that shall enable us to make faithful application of them to all the conditions in which we find ourselves to be placed, and then for such fidelity and watchfulness as shall ensure our observance of them in every particular, even the least. This must be the prayer. And with the prayer, precisely as in the former case, there must be, and there necessarily will be, joined, first, the earnest study of these principles of conduct, that will enable us to perceive at once their application to every case as it arises, and, united with this study, the ceaseless watchfulness and the faithful doing of everything that is devolved on us to be done.

THE END.

MECHANICS

— AND —

FAITH.

— BY —

CHARLES T. PORTER.

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